Persuasion in the context of a psychic reading

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To Jacqui and to my parents

Acknowledgements and declaration

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Declaration

This thesis has been composed by myself and the work is my own.

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Abstract

This thesis considers the claim that although there is little reason on the basis of experimental evidence to believe that psychic readers have paranormal access to information about their clients, nevertheless individuals are persuaded that such claimants have demonstrated that they possess psychic abilities. A random sample survey of 1,000 residents of Edinburgh district did find support for the claim that the general population is sympathetic to the claims made by psychics. These findings are reconciled with reference to Pseudopsychics' claimed ability to simulate psychic abilities through the use of a technique known as cold reading. A model is proposed, informed by a review of pseudopsychic literature and a pilot study with a known cold reader, which suggests that cold reading actually consists of a number of discrete but interdependent techniques. Central to the model is that much of the reading is dependent on the Barnum effect for success. Experimental work assessed the previously untested assertion that pseudopsychic statements are capable of inducing Barnum acceptance, and found that such items perform in a similar manner to classical Barnum statements. These statements were used to expand the Barnum pool so that the nature and causes of Barnum acceptance could be studied more systematically. One study explored those properties inherent in Barnum statements which are regarded as contributing to their ready acceptance as true of Ss. It was found that acceptance of items could be predicted on the basis of independent judges' ratings of eight statement properties.

Two further studies presented Barnum items as pseudo-feedback from an ostensible psychic reading. These were conducted to explore a proposed model which suggested that Ss accept items because of an artifact of cognitive processing, whereby Barnum statements are not assessed for accuracy in their given form, but rather are interpreted by the client in terms of their own particular circumstances and concerns. Predictions were made on the basis of the artifact model about Ss' recall for the content of the reading, and provided some support for this characterisation of the effect. A final study was conducted to assess the contention that experimental tests of psychic readers misrepresent the function of the reading, and makes the suggestion that with regard to psychic functioning, the client may actually be an active participant. The implications of these results for testing and evaluating psychic readers are discussed.

Contents

Chapter 1: Introduction

1.1 Introduction

Parapsychology has been defined as the study of "interactions, both sensory and motor, that seem not to be mediated by any recognized physical medium or agency." (Rush, 1986a, p. 4). Such interactions are known collectively as 'psi' although parapsychologists often distinguish between phenomena according to the form that the interaction takes. For example, if information transfer appears to be directed from the environment to the individual, it is taken to be an example of extra-sensory perception (ESP), whereas if transfer appears to be from the individual to the environment, it is described as an example of psychokinesis (PK).

Other properties of the phenomena (particularly the nature of the psi source and the temporal relationship between source and percipient) are often identified in order to allocate the event to one of a number of subclasses. The most common distinctions are made between telepathy, which implies mind to mind transfer of information, and clairvoyance which refers to instances where no individual is consciously aware of the nature of the information source. Where there is also a temporal barrier to communication, the experience may be an instance of precognition, in which the event exists only in the future, or (more rarely) retrocognition, where the event exists only in the past[1]. These physical and temporal properties are independent, so that an experience may be, for example, an instance of telepathy, telepathic precognition, or telepathic retrocognition, clairvoyance, clairvoyant precognition, or clairvoyant

retrocognition. Subgroups can often be difficult to tease apart in practice, and it is common either for this difficulty to be explicitly recognised by referring to general ESP (GESP) effects, where either clairvoyance or telepathy is possible, or for the distinctions to be made operationally, in terms of the conditions of the study (see Palmer, 1978, especially sections 2.1.2 and 2.5.1). A number of general textbooks give good overviews of investigations of these phenomena, including Broughton (1991), Edge et al. (1986), and Irwin, (1994). More technical reviews are given by Palmer (1978) and Schmeidler (1987, 1994a, 1994b). For more sceptical accounts, see also Akers (1984), Alcock, (1990), Hansel (1980, 1989), Hyman, (1985, 1994), and Marks & Kamman (1980).

A major shortcoming of the current characterisations of parapsychological phenomena is their need to be defined negatively; since we still know little about the process, the defining characteristic remains the perseverance of information transfer under conditions where barriers (physical or temporal) are in place to prevent communication by presently recognised methods. It necessarily relies, then, on our having a good understanding of the 'normal' channels of communication and inference that exist in any particular context, so that we are in a position to recognise when these are not available. For example, the movement of a book on a shelf is not in itself anomalous, since there are many mundane ways in which the effect could have been achieved; somebody may have pushed the book prior to the witness observing it; the book may have been balanced precariously such that small vibrations or air currents could have overbalanced it, and so on. It is only when we

believe that none of the range of possible conventional causes is likely that we start to credit an event with more meaning or weight. The degree of impact that any particular phenomenon is likely to have is thus heavily dependent on our ability to recognise what ways information or influence could pass from one point to another, and on our satisfaction that adequate barriers were in place to prevent such passage.

Work in parapsychology is handicapped by an incomplete understanding of the channels of communication that may exist between subject and environment, particularly where Ss have expertise in the art of deception (see, e.g., Delanoy, 1987; Randi, 1983a, 1983b; but see also Morris, 1986b, for a quite detailed description of general methods for opening such channels). Where channels are recognised, their treatment has not generally involved attempts to articulate the nature and quality of information which can be communicated should the channel be open, but rather has consisted of relatively crude attempts to construct barriers to prevent such communication[2]. For example, Hyman (1985) has treated the use of a single target set as a serious flaw in ESP studies which utilise blind judging since it offers the potential for the percipient to pick up on subtle cues left on the target picture by the agent in handling it (known as the 'greasy fingers hypothesis'). As a consequence, the results of all studies which included this flaw are considered dubious. However, attempts to experimentally verify whether individuals *can* be influenced by such cues have suggested that the effect is limited to *photographs* of targets (i.e. does not extend to the viewmaster reels or projector slides that have sometimes been used as targets) and is found only where Ss are explicitly instructed to look for signs of

handling (Palmer, 1983; Palmer & Kramer, 1984). This example is not meant to imply that we should allow the use of sloppy methodology, but rather draws attention to the tendency of sceptical commentators to be interested only in the existence (or not) of channels, not with an evaluation of their extent or limitations.

Much work needs to be done to better map out and characterise the full range of means by which communication can be effected between a percipient and a source before one needs to invoke a mechanism that requires psi. To this end, it seems likely that parapsychologists would benefit from greater awareness of the literature of the psychology of deception, which in part involves articulating the exploitation of precisely these channels. Hansen (1985, 1987, 1990, 1992b) has consistently urged researchers to become familiar with this literature, particularly that associated with conjuring. The present thesis is intended to constitute part of an ongoing programme of research which responds to this identified need (see also Wiseman, 1992a, Wiseman & Morris, 1994, 1995b).

1.2 The problem of subject fraud in parapsychology

Mapping the processes of fraud also promises to assist parapsychologists in dealing with individuals who publicly claim to be psychic. Outwith experiences of spontaneous psi, it could be argued that the major source of interest in the subject matter of parapsychology is through encounters with individuals who claim to possess exceptional psychic abilities (see Schouten, 1993). For example, Richards (1990: 274) notes that "Consultation with a psychic for personal counselling is

perhaps the primary application of psi in our culture", while Hyman (1989: 346) claims that "millions of clients not only consult occult practitioners, but also wrongly believe in their claims". Schouten (1994) has argued that parapsychologists have an obligation to consider the claims of such individuals

> Many psychics are active today, and frequently people want to know from parapsychologists whether they should or should not consult such persons, and if they do, what they might expect and how they might evaluate the statements made to them by the psychic or medium. As scientists in this field we have to provide answers to such questions. (p. 222).

Indeed, the popularity of spiritualism and the growing number of practicing mental mediums in the late 19th century were instrumental in bringing about the founding of the Society for Psychical Research [SPR] (Rush, 1986b). Although the investigative remit of the Society was wide enough to encompass a range of phenomena, including hypnosis, dowsing and hauntings, a significant amount of its energies was directed toward evaluating mental mediums and psychics such as Mrs Piper and Mrs Leonard (see Haynes, 1982; Nicol, 1982). Schouten (1994) has described interest in psychics and mediums as being at the centre of the early SPR's activities, and this emphasis is readily apparent from even a casual glance at the early journals and proceedings, which devote hundreds of pages to the consideration of readings given by mediums. This tradition within parapsychology of working with gifted individuals has continued to some degree to the present day, with a number of researchers reporting investigations with claimants such as Gerard Croiset (Bender, 1957), Uri Geller (e.g. Targ & Puthoff, 1974), Felicia Parise (Honorton, 1974), Ingo Swann (Puthoff & Targ, 1974), Bill Delmore (Kanthamani & Kelly, 1974), Lalsingh Harribance (Roll et al., 1975), Nina Kulagina (Keil & Fahler, 1976), Peter Sugleris

(Schmeidler & Imich, 1992), Malcolm Bessent (Palmer & Broughton, 1995), Swami Premananda (Wiseman & Haraldsson, 1995), and Sai Baba (Haraldsson & Wiseman, 1995)[3]. Others have worked with selected groups of gifted individuals such as psychic readers (e.g. Boerenkamp, 1985, 1986a; West, 1949) and shamans (e.g. Saklani, 1988).

Such individuals are particularly important to experimental parapsychology, for despite spontaneous paranormal experiences being quite common (see, e.g., Haraldsson, 1985), relatively few people claim to be able to produce phenomena more or less at will (see Schouten, 1994). In offering the prospect of *replicable* phenomena, such claimants allow the possibility of countering one of the major criticisms of the field (see Shapin & Coly, 1985, for a detailed treatment of this issue). Generating relatively consistent phenomena would also allow experimenters to better monitor the effects of moderator variables in process-oriented work. A number of prominent parapsychologists have championed the major paranormal phenomena associated with 'gifted' individuals on other grounds (e.g. Beloff, 1995; Braude, 1989; Stevenson, 1989). Indeed, Stephen Braude has argued that human abilities are best studied *in extremis* and in the environment in which they naturally occur (Braude, 1986). Such an approach has some advantages over laboratory-oriented research in that it can claim ecological validity, and is likely to be more psi-conducive, since it uses 'selected' subjects under what they consider to be optimal conditions for success (see also Morris, 1982, for a discussion of the pros and cons of using selected Ss).

However, research with gifted subjects has generally been eschewed in favour of work with unselected Ss in large-sample studies[4], and this has become the prevailing approach in parapsychology since the work of J.B. Rhine and colleagues (see, e.g., Rhine, 1973, for a detailed account of this work; see Morris, 1982, and Rush, 1986 for overviews of this transition). Richards (1990) accounts for this shift in emphasis with reference to the lack of control associated with the former, the difficulty of objectively evaluating the material generated, the overall complexity of the process, and most importantly the underlying suspicion of deception.

Although the potential for subject fraud is present in any research with human participants, the problem is regarded as especially serious in parapsychology, which has tended to attract fraudulent individuals (cf. Hansen, 1990), and for whom such accusations further weaken a fragile reputation among the general scientific community (see, e.g., McClenon, 1982). John Palmer (1988), for example, has concluded that "Psychic fraud ... has been the single most important factor in damaging the reputation of parapsychology and retarding its growth." (p. 109). The standard protocol for research in parapsychology, using a large sample of unselected Ss each of whom only contributes one or two sets of data to a much larger series may not be guaranteed to preclude deception. However, it has been argued that the motivations for fraud are diminished (Morris, 1986a), and that the likelihood of deception and its perceived consequences for the study outcome are severely restricted (Hansen, 1990).

Failure to counter actual subject cheating or accusations of cheating can have serious consequences, both for the individual researcher and for parapsychology as a whole. This is perhaps best illustrated with reference to the 'Project Alpha' affair (Randi, 1983a, 1983b; Truzzi, 1987). In this case, magician James Randi set out to expose the lack of expertise in detecting fraudulent claimants at the McDonnell Parapsychology laboratory by having two pseudopsychics[5] offer themselves for testing. Although the researchers at the laboratory did not make any formal statements as to the validity of their claims of psychic ability, neither did they manage to detect the trickery employed to simulate effects. Wiseman (1992a) claims that "Randi's revelation of the hoax contributed to the loss of funding, and eventual closure, of the McDonnell laboratory." (p. 5). Gardner (1985) gives a similar account.

Wiseman & Morris (1995b) note that researchers who fail to guard against cheating also face the problem of false accusations. Even should a claimant demonstrate genuine psychic ability, if the procedure is not designed to guard against potential fraud, then critics maybe able to dismiss the data as due to subject deception. In such a way, considerable time and money will be wasted and the good will and reputation of the claimant will be lost. Indeed, studies held up by parapsychologists as good evidence for psi have often been brusquely dismissed by sceptics. David Marks has recently claimed that "Not a single claim of the paranormal has been confirmed by independent investigators ... the field is rife with fraud, trickery, illusion and error"

(Marks, 1988, p. 332). In a similar vein, Gordon (1987) is quoted by Hansen (1992b, p. 163) as stating "Every psychic I know or have heard of is an absolute fraud". Impressive personal experiences in the context of psychic readings are often casually dismissed in terms of claimant fraud (see, e.g., Alcock, 1981, pp 48-50; Marks & Kamman, 1980, pp 187-193), particularly with reference to the pseudopsychic practice of 'cold reading' (e.g. Feder, 1987; Randi, 1981; Schwartz, 1978; see Hyman, 1977 for an overview of this technique, which is discussed in some detail in forthcoming chapters). Dutton (1988) has commented that "For many people, belief in the paranormal derives from personal experience of face-to-face interviews with astrologers, palm readers, aura and Tarot readers, and spirit mediums. These encounters typically involve cold reading." (p. 326). It seems as if some commentators are inclined to make such an attribution without needing to know anything about the actual content of the readings solicited - if it was impressive, it must have been achieved by fraudulent means. Nor are they under any obligation to indicate that they are aware of the actual limitations (if any) of this method; for example, what conditions it requires to be effective, and what kind of material it is capable of generating under those conditions.

We need some means to assess how appropriate such criticisms or counterclaims are. They may actually be devoid of content, or be practically untestable, or in some other way be too unspecified to be useful. On the other hand, more informed criticism may be constructive and helpful, forcing us to re-evaluate our evidence. The acid test is that they should be able to generate hypotheses about when and in

what way such methods could have been used - in other words, they should be able to make potentially falsifiable predictions[6].

1.3 Recognising deception

In any case, the issue of subject fraud is not black and white; individuals who claim to demonstrate psychic ability, but who exploit normal means of communication and inference, can actually be arranged along a continuum of awareness of the techniques being used, from self deception through to being fully aware that one is being fraudulent. Keene (1976), for example, makes a distinction between 'shut-eyes', who believe that they possess genuine psychic ability, and 'open' psychics, who consciously use trickery to fabricate all demonstrations of psychic phenomena. Shut-eyes may still be unwittingly exploiting normal channels of communication to inform their 'psychic impressions', for example by responding to information processed below the level of consciousness as in subliminal perception. Irwin (1994) provides an illustration of how this may work;

> You may be concentrating on some activity when an old friend happens to speak in your vicinity. Shortly afterwards you may start daydreaming about your old friend; at that moment the latter taps you on the shoulder and you cry in amazement, "Why, I was just thinking about you!". (p. 56)

In the case of a psychic reader, this may simply take the form of being perceptually sensitive to available information about a client - for example, noticing at an unconscious level that they have a ring-mark but no ring on the wedding finger, which may reach consciousness in the form of a 'feeling' that the client has had severe marital difficulties in the past year. Bringing the existence of such channels to

the attention of psychic claimants may assist them in generating a more realistic assessment of any abilities they may have.

Morris (1986a) describes how psychic deception need not be motivated only by personal gain in terms of wealth, power and fame - although of course these can be very motivating - but may simply reflect a desire to be socially helpful. Towards the middle of the deception continuum we may thus find cases of sincere Ss who feel they have to resort to fraud when their own capricious psi is eluding them or is not thought sufficient for the task in hand. Delanoy (1987) has noted that

> A S who has genuine psi ability, or thinks he has, may resort to intentional deception upon occasion. This may be done for a variety of reasons. Perhaps fraud may be used to heighten a genuine effect, or it may be resorted to if the 'real thing' does not appear forthcoming. The S may even feel that there is nothing particularly wrong with 'helping the effect along' if he is convinced that his ability is genuine. (p. 254 - 255).

Some researchers are also sympathetic to such shows of weakness, and have argued that they may in fact be necessary to ensure the optimal conditions for eliciting psi. John Beloff (1991), for example, he has defended the thesis that psychics may cheat on occasion while still being able at other times to produce genuine phenomena, and echoes Kenneth Batcheldor in suggesting that "giving nature a helping hand ...; primes the pump that, with patience on our part, produces the desired paranormal flow" (p. 49). Others (e.g. Kurtz, 1985a) have argued that if a claimant has been caught cheating in the past, then all the data from them should be discounted. Indeed, the early SPR had a policy of not working with individuals who had been caught cheating (Haynes, 1982), although there appear to have been exceptions (e.g. Fielding, Baggally & Carrington, 1909, worked with Palladino despite her having

already been caught cheating on numerous occasions). Recognising the capabilities of conventional channels of communication promises to allow the researcher to better distinguish between effects achieved by trickery and those worthy of closer inspection.

At the other end of the deception continuum are individuals who consciously use trickery to fabricate all evidence of psychic ability. Although he argues that the problem of overt fraud is not as serious as generally believed, Hansen (1990) has noted that "every annual convention of the PA since 1980 has included papers reporting positive results from subjects who later admitted to, or were reported as having used trickery at some point in their careers" (p. 26). Indeed, there is evidence to suggest that some pseudopsychics go to great lengths to gather information about their clients (see, e.g., Fuller, 1975, 1980; Keene, 1976; Lyons & Truzzi, 1991). There exists a vast hidden literature documenting methods for fabricating psychic phenomena of which parapsychologists are still generally unaware (e.g. Corinda, 1984; Jones, 1989), and there are currently five periodicals which are devoted exclusively to fabricating psi; *Krypts Quarterly Crier, Magick, The New Invocation, Snake-Oil Almanack,* and *Vibrations* (Hansen, 1992b, p. 152). Some commentators (Keene, 1976; Lyons & Truzzi, 1991) have claimed that the psychic reading community organises itself in a sophisticated manner which allows them to share intelligence about their clients. Researchers need to be made aware of the potentially high level of sophistication of pseudopsychics and of the lengths to which they may be willing to go in order to falsely represent themselves as psychic.

1.4 Responding to the threat of deception

As we have noted, one response to the threat of psychic fraud has been to refuse to investigate psychic claimants altogether, preferring to work instead with large groups of unselected subjects. Alternatively, researchers may attempt to impose such severe controls within the experimental protocol as to make the fraud hypothesis untenable. Such precautions are laudable in theory, but currently have two weaknesses. Firstly, they pay little attention to the nature of the claim, demanding equally stringent controls for all experiments, irrespective of the manner in which intended effects are likely to be simulated. This wastes a great deal of resources on inappropriate concerns. Hansen (1990) summarises this policy when he states

> To date, there has been no established code or philosophy that provides guidelines as to level of security needed when working with various types of subjects. The views expressed have often been contradictory. Some have demanded equally stringent controls for all psi experiments. However, that is not a workable approach. (p. 32)

Secondly, they fail to take into account any (purported) necessary conditions for eliciting psi. Tightly controlled laboratory conditions can seem intimidating and artificial to subjects, and it has been argued that they can serve to inhibit phenomena which are already quite elusive[7]. We may harbour serious doubts as to the ecological validity of the experimental environment, and suspect that this will have consequences for the type of effects evinced. Laboratory studies tend to give rise to only *micro phenomena,* that is, effects which require statistics for their detection (Stevenson, 1990). Micro effects include, for example, laboratory attempts to influence the output of a random event generator (REG) such that it deviates away from chance expectation in a pre-specified manner (see Radin & Nelson, 1989 for a

review and meta analysis of REG studies), whereas macro effects are readily apparent to observers, and would include the movement of an object or the bending of a key (see Braude, 1986, for a discussion of these phenomena). Laboratory phenomena typically only present themselves in the form of extremely small effects (see, e.g., reviews by Bem & Honorton, 1994; Braud & Schlitz, 1991; Honorton & Ferrari, 1989), which although highly unlikely statistically, are much less compelling, even to researchers, than macro effects can be (see Randi, 1985). More importantly, they tend to bear such little resemblance to the real-world experiences they are intended to simulate, that we may suspect that the former can tell us little about the nature of the latter.

1.5 Modelling psychic fraud

An alternative can be proposed which promises to retain an environment that is as ecologically valid as possible without compromising the need for control for possible subject fraud. This involves recruiting conjurors to assist in the design and evaluation of protocols so that experimental conditions can be negotiated with the claimant in a manner flexible enough to allow them to work under their (perceived) ideal conditions. A number of commentators have stressed the need to enlist magicians (e.g. Gardner, 1985; Randi, 1985). Although some parapsychologists have consulted with magicians in the course of their work (e.g. Delanoy, 1987), these may still be in the minority. In attempting to explain why this may be the case, Hansen (1990) has noted that

> Most researchers do not know enough about conjuring to establish and maintain effective communication [with magicians]. (p. 55).

And it is a formidable task for researchers to obtain the necessary level of expertise, as the literature is difficult to obtain;

> there can be penalties for revealing methods to those outside the fraternity ... there is much disagreement within the magical community about revealing methods of mentalism when such is presented as genuine. (Hansen, 1990, p. 57).

Modelling psychic fraud offers a means of transmitting in a manageable form this vast but generally hidden expertise. It does not represent a replacement for more detailed understanding, but would provide a platform from which to begin independent research or for establishing contact with relevant experts. Providing models of psychic fraud should bring with it a number of other advantages for the researcher who is interested in working with 'gifted' individuals.

(i) These models of deception should help us to recognise general strategies of fraud and be able to make predictions about when and how the claimant should be able to be successful if using only trickery. These can be applied prospectively, in generating guidelines for protocol design (see Wiseman & Morris, 1995b), giving rise to experimental controls or specified conditions for testing individuals which should be capable of ruling out many forms of cheating such that any subsequent positive trials are not so easily brushed aside. When applied retrospectively, they may provide a ruler with which to differentiate the results of deceptive techniques from any more interesting anomalous effects (e.g. Wiseman, 1992b, attempts to provide a benchmark for the generation of some PK phenomena). Whilst we cannot guarantee that generating guidelines

from a model of psychic fraud will allow us to detect *all* instances of deception, the same is true of recruiting magicians to make on-site observations. In both cases, the effort is nevertheless very worthwhile, since they offer expertise in the methods by which effects may be manufactured[8].

The tactics of fraud are numerous, and it is unlikely that an individual will be able to recognise them all. However, these tactics reflect a more limited number of stratagems (Wiseman & Morris, 1994) which may be easier to recognise. In the case of mental effects produced by pseudopsychic readers, these methods of trickery are particularly well known (cf. Hyman, 1977; Roe, 1991).

Morris (1986a) has argued that "a major challenge for researcher and attendant experts is to develop imaginative yet sound procedures for measuring psychic functioning, procedures that will accommodate the interests of a variety of serious claimants." (p. 146). As the models are at the level of general strategies rather than specific tactics, they afford greater flexibility, allowing the experimenter to negotiate controls specifically tailored to the claims and needs of the claimant without sacrificing security (cf Wiseman & Morris, 1995b). If successful, this would provide the means to work in more flexible psychological and social conditions, more naturalistic for, and more suited to the needs of the claimant while still being in a position to effectively control leakage, and draw attention to those effects which require explanation in terms of new mechanisms.

For example, Wiseman et al (1992) have demonstrated how protocols need not be imposed arbitrarily, but can be negotiated from a position of expertise.

(ii) The researcher is better able to use initial interactions with claimants, during which the conditions of testing would typically be discussed, to dissuade or discourage pseudopsychics from even attempting fraud. Morris (1986a) has recommended that the claimant be convinced that should they resort to trickery, the likelihood of detection is high. This can be intimated by demonstrating familiarity with the techniques of the trade or with classic works such as Corinda's *13 Steps to Mentalism* (Corinda, 1984).

(iii) Informed controls are also likely to have positive side-effects. As the experimenter's confidence in the protocol increases, so will his expectations of the likelihood that any effects are due to psi rather than other factors. The experimenter and participant can have more confidence that the effort involved in the study will be worthwhile as any positive results cannot be easily dismissed on account of methodological shortcomings. Likewise, Ss confidence in the procedure would help allay fears of being automatically accused of fraud, which otherwise seems likely to dissuade earnest claimants from subjecting themselves to testing.

1.6 Consequences for a general psychology of deception

It could be argued that studying psychic fraud will also serve to inform our understanding of human communication generally, especially as it relates to modelling human deception. Hyman (1989) has drawn attention to the broad range of forms that deception can take, including (among others)

> Practical jokes, forgery, imposture, conjuring, confidence games, consumer and health fraud, military and strategic deception, white lies, feints and ploys in games and sports, gambling scams, psychic hoaxes. (p. 133)

Given this diversity, it may not be surprising that there is as yet no single, coherent framework or model which purports to account for the psychological component of deception. However, Hyman (1989) believes that such a framework is possible, at least in the sense of deriving a better understanding of phenomena through reference to sub-disciplines of psychology such as perception, schema theory, etc..

Some commentators have suggested that similar psychological mechanisms may underlie deception regardless of its setting, and a few of these (e.g. Jastrow, 1900; Whaley, 1984; Lambert, 1987) have offered proto-theories which incorporate such general principles. If deception is a unitary phenomenon in this sense, then careful study of one form is likely to provide some insight into the nature of trickery generally.

1.7 Previous research considering psychic fraud

It is surprising, in the light of the general importance of the issue of fraud noted above, that Hansen (1990) can comment that

> there has been rather little parapsychological literature (in either the journals or other major reference sources) dealing with the topic of subject deception. (p. 26)

Of the work that has been published on the subject of psychic fraud and the assessment of claimants, most has focussed on individual cases (e.g. Busch, 1987; Delanoy, 1987; Frazier & Randi, 1981; Haraldsson & Wiseman, 1995; McBurney & Greenberg, 1980; Marks & Kammann, 1980; May & Jahagirdar, 1975; Pamplin & Collins, 1975; Randi, 1983a, 1983b, 1987; Wiseman, 1992b; Wiseman, Beloff & Morris, 1992; Wiseman & Haraldsson, 1995). However, some of the literature has attempted to provide more general descriptions of the types of methods used by pseudopsychics (e.g. Couttie, 1988; Randi, 1982; Wiseman & Morris, 1995a, 1995b). In his recent review of psychic fraud within parapsychology, Hansen (1990) considered some of the stratagems used by pseudopsychics, and their relevance for methodology within parapsychology. Other authors who have briefly discussed the stratagems of psychic fraud include Akers (1984), and Alvarado (1987)

A smaller number of papers have explicitly discussed the techniques that underlie psychic fraud. For example, Marks & Kammann (1980) briefly describe some of the methods allegedly practiced by both Kreskin and Uri Geller, and Morris (1978, 1982) has outlined a number of the major stratagems that can be used to fabricate psi. He has gone on to offer some recommendations to counter the risk of psychic

fraud in laboratory studies (Morris, 1986b). Morris (1986a) has also presented probably the first conceptual framework for understanding some of the principles involved in fabrication of both ESP and PK. This has recently been elaborated upon by Wiseman & Morris (1995a, 1995b) to provide a set of guidelines for testing psychic claims.

This guide is still not comprehensive, however, and further work needs to be done (see Ruffles, 1995). Indeed, further expanded editions of the guide are planned (cf. Wiseman & Morris, 1995, p. 55). In particular, this work shares the tendency of much of the literature on psychic fraud to focus on the simulation of physical effects (such as bending keys) rather than mental effects (such as ostensible ESP). One way in which this effort could be extended is to offer a complementary model which articulates the general techniques used to fabricate mental phenomena.

A number of commentators have produced annotated examples of pseudopsychic readings or pseudopsychic predictions, which provide some insight into the processes at work (Corinda, 1984; Dutton, 1988; Feder, 1987; Frazier & Randi, 1981; Fuller, 1975, 1980; Hoebens, 1981; Hyman, 1981; Randi, 1981; Schwartz, 1978; and Society for Psychical Research, 1965).

These psychological processes have been referred to more directly by a few commentators. Alcock (1981), for example, claims that "fortune tellers 'succeed' in part because of their clients' readiness to believe. The readings given by some

fortune tellers are so general that they would apply to anyone." (pp. 48-49), and Hoebens (1981) gives an account of Gerard Croiset's 'successful' psychic predictions in terms of generalities which are unlikely to be false, but which are modified in the retelling to seem more unlikely than they really were. Dutton (1988) suggests that only confirmations are remembered, often quite vividly, whereas less plausible aspects of the description are paid correspondingly less attention. Blackmore (1994) has treated the psychic reading as an instance of poor probability judgements

> The reader or psychic tells the client various facts about him or herself. Some of these are true and the client judges that far more were true than could possibly have been guessed at by chance. The client is therefore convinced that the reader has psychic powers. (p 74)

More detailed descriptions of the techniques by which pseudopsychic readings are made successful are given by Couttie (1988), Lyons & Truzzi (1991), and Marks & Kamman (1980), but by far the most extensive treatment is given by Hyman (1977, 1981). However, this latter overview is beginning to become somewhat dated in the face of an expanding pseudopsychic literature which provides first-hand accounts of the methods used (e.g. Cain, 1991; Corinda, 1984; Earle, 1990a, 1990b; Fuller, 1980; Hester & Hudson, 1977; Hobrin, 1990; Jones, 1989; Lewis, 1991; Martin, 1990; Ruthchild, 1976, 1981; Webster, 1990). This work will be reviewed in a later chapter.

1.8 Outline of thesis structure

It has been noted above that notwithstanding the few exceptions (e.g. Hyman, 1977; Morris, 1986b; Wiseman, 1992a) the stratagems of psychic fraud have not been fully

explicated, and that in any case the most extensive research has concerned fabrication of PK rather than ESP (e.g. Wiseman, 1992b; Wiseman & Morris, 1994b). This thesis aims to redress this imbalance somewhat by exploring the fabrication of mental phenomena through the process of 'cold reading', mapping the psychological processes at work, comparing what might be termed 'folk psychology'[9] accounts drawn from active pseudopsychics with ideas drawn from academic psychology.

Chapter 2 will present the results of a survey intended to gauge the extent to which the general public treats seriously the claims of professional psychic readers. It has been claimed by a number of commentators (e.g. Aphek & Tobin, 1989; Hyman, 1989) that a substantial proportion of the Western population regularly attends psychic readings in one form or another, and is favourably impressed with the information they have been given. This study assesses the actual incidence of reading attendance for a stratified pseudo-random sample of Edinburgh residents. It further probes the motivations of clients in attending, and gauges the client's own evaluation of the reading, as well as assessing the impact that the reading has had upon the client in terms of influencing their feelings or perceptions about their predicament, or affecting important life-decisions they have made. Chapter 3 addresses some of the methodological issues which must be considered when conducting survey research, and which informed the protocol adopted in the study described in chapter 2. This treatment is provided separately so as not to disrupt the link between the

review of literature on paranormal belief and practices and the study designed to explore these issues in more detail.

Chapter 4 will review the magic literature[10] which describes the *modus operandi* of pseudopsychic reading, particularly the process of cold reading. A model of cold reading is described which actually represents the process as a hierarchical collection of independent strategies, from quite basic methods such as the exploitation of the Barnum effect[11], through to quite sophisticated methods which exploit the reader-client dyad. These various strategies are described. Central to the model is that much of the reading is dependent for success on the Barnum effect.

Chapter 5 will describe an experimental evaluation of the claim that pseudopsychics are exploiting the Barnum effect. This assertion has been made by a number of commentators (e.g. Dutton, 1988) and even by practicing pseudopsychics (e.g. Earle, 1990) but has not previously been explicitly tested. The evaluation consisted of presenting pseudopsychic statements along with classic Barnum statements using a protocol which is typical of the Barnum paradigm (see Furnham & Schofield, 1987, for a review).

Accounts of the success of the pseudopsychic reading in terms of the Barnum effect do not provide a completely satisfactory explanation of the phenomenon, since they do not give any insight into why individuals should be so accepting of general personality descriptions, or why they should find such feedback surprising and

impressive. Chapters 6 and 7 will explore the nature of the effect in more detail. The former describes an experiment which considered properties inherent in the statements themselves which may contribute to their ready acceptance (see, e.g., Snyder et al., 1977). The latter chapter provides details of an alternative characterisation of the Barnum effect in terms of an artifact of cognitive processing, and describes two studies designed to evaluate it.

Chapter 8 provides a speculative account of the psychic reading which argues that conventional assessments of readers misrepresents their role, which is primarily as a counsellor / consultant rather than a generator of clearly paranormal information. An alternative protocol is suggested, and this is used to assess the suggestion that the client may be an active participant in any psychic element of the reading. Finally, Chapter 9 will summarise the main findings of this thesis and suggest possible directions for future research.

It should be noted that the order in which these studies are described does not represent the chronological order in which they were completed. In particular, the survey described in chapter 2 was - for practical as well as theoretical reasons - still on-going after all the experimental work had been completed, and a pre-study which is described as part of chapter 6 was in fact the first to be conducted. The order of description adopted here is purely for clarity of exposition.

1.9 Chapter summary

This chapter first described the major categories of phenomena which are of interest to parapsychologists, and noted the problems inherent in adopting definitions which describe phenomena negatively, that is, in terms of the perseverance of effects under conditions where conventional communication is prevented. It is argued that parapsychologists need to develop a better understanding of the normal means of communication which may be available in any given context, so as to be more able to determine when an anomalous attribution is appropriate in describing an effect. It is suggested that this can best be achieved by considering techniques of psychic fraud, which typically exploit such communication channels. Issues arising from the problem of subject fraud in parapsychology are discussed, particularly in the context of testing 'gifted' individuals. The benefits of modelling the stratagems of psychic fraud are articulated, and previous attempts to provide such a model are reviewed. Finally, the chapter provided an overview of the aims of the thesis and the methods by which these were to be achieved.

[1] For this latter it is obviously essential to ensure that there are no contemporaneous sources of information about the event (such as newspaper accounts, historical accounts etc..)which may be available via clairvoyance, but without these sources it becomes virtually impossible to check the fidelity of the experience.

[2] Exceptions have addressed non-verbal communication (Hyman, 1977; Rosenthal, 1979) and various forms of muscle-reading (e.g. Christopher, 1970).

[3] We might also include Blackmore's (1983) study, which could be considered a self-test.

[4] Some have opted for what might be thought of as a middle way, which uses a large number of subjects who have been selected because they fulfil certain criteria such as having had previous psychic experiences, or regularly practice a mental discipline (see, e.g., Bem & Honorton, 1994).

[5] A pseudopsychic can be defined here as a person who produces information or effects which are claimed to be the result of special psychic abilities, but which are in fact generated through normal means.

[6] An illustration of how criticism can be made constructive is provided by Richard Wiseman's comments on the Fielding Report (Wiseman, 1992b). While not wishing to offer a position on the validity of his claim, it is worth noting that he comes out well on the above measures. We can see from the comments of others (Barrington, 1992; Fontana, 1992) that his criticisms can be subjected to close scrutiny and are, at least in theory, capable of being refuted. They may also be considered to be constructive, since they cause us to reconsider the amount of detail which is required when recounting the number and types of controls which are in place in such studies. Such a shift in approach by sceptics should be applauded.

[7] This is not intended as a defence of the claim that experimenter- or oberver-psi can act to inhibit the subject's performance on some task, but rather refers to more conventional experimenter effects which certainly seem strong enough to account for differences of this type (see Rosenthal & Rubin, 1978).

[8] It is true that magicians are capable at times of being fooled by other magicians. However, this point should not be overstated, since many of these cases involve a subpopulation of magicians who are highly skilled and who specialise in fooling their peers. Pseudopsychics are usually not so proficient. Secondly, a distinction must be made between not recognising the specific techniques being used in producing an effect (which may be quite common), and not recognising the general method or stratagem (which is less common).

[9] Although it has been argued that folk psychology may often be incomplete or even inaccurate (e.g. Churchland, 1984; Nisbett & Wilson, 1977), others have argued that this represents a useful point from which to begin theory construction (e.g. Flanagan, 1984; Heider, 1958; Joynson, 1974). Folk psychology accounts of the action of cold reading are especially promising because of the greater validity of accounts written by practicing (and presumably successful) pseudopsychics.

[10] It is not claimed that this literature review is comprehensive. This would be extremely difficult to achieve in practice given the specialist nature of the material, which is not intended for the general public and which effectively represents a sharing of expertise among a sub-group of magicians who specialise in simulating psychic abilities. We can, however, be confident that the literature described is representative of the genre (particularly given the substantial overlap of material among the sources which have been collected).

[11] The Barnum effect has been defined by Dickson & Kelly (1985: 367) as the phenomenon wherein "people accept general personality interpretations as accurate descriptions of their own unique personalities".

Chapter 2: Belief in the paranormal and attendance at psychic readings

2.1 Introduction

2.1.1 Levels of Belief in the population

There has been considerable interest within parapsychology in assessing the extent and bases of belief in paranormal phenomena held by the general population. As well as providing insight into the aetiology of such belief, this knowledge is valuable to parapsychology in that it promises to afford greater control over the phenomenon in experimental settings (Lawrence, 1993), and to account for the different forms of 'mental conflict' experienced by parapsychologists and skeptics in the face of evidence for psi (Irwin, 1993). For skeptics, high levels of belief despite 'inconclusive' evidence presents a puzzle to be solved in terms of observational and cognitive biases (French, 1992) .

A variety of measures are currently available through which to gauge paranormal belief. These range from relatively narrowly defined sheep-goat[1] scales which are often derived from experimental / predictive measures (e.g. Bhadra, 1966; Thalbourne & Haraldsson, 1980; Thalbourne & Delin, 1993) through to more wide-ranging definitions of 'paranormal' which encompass belief in phenomena as disparate as extraordinary life forms, witchcraft and religion (Jones, Russell & Nickel, 1977; Otis and Alcock, 1982; Sobal and Emmons, 1982; Tobacyk, 1988).

Despite the wide variation in measuring instrument, there is a perhaps surprisingly consistent picture of the relatively high level of admitted belief in paranormal phenomena. For example, Grimmer & White (1990), surveying 836 introductory psychology students (mean age 21.31 years) found that 47.37% of their sample accepted that ESP is real, while Sobal & Emmons (1982) report on a general US survey which found 50% belief in ESP. These estimates are reassuringly close given the differences in the sample populations.

High levels of belief do not seem to be specific to any particular society; having been found in surveys in New Zealand (Clarke, 1991), Australia (Grimmer & White[2], 1990), Iceland, Great Britain, Sweden, and the US (Haraldsson, 1985). Although these may be claimed to reflect a single 'Western' culture, substantial belief in the reality of telepathy has also been found in samples from South Korea (Haraldsson & Houtkooper, 1991) and China (McClenon, 1994), but not in Japan (McClenon, 1994)[3].

As one might expect, however, reported levels of belief are lower where the definitions are more narrow, and lower still where respondents are asked to report actual experience of that phenomenon (see Schmeidler, 1985).

2.1.2 Causes of belief

Our understanding of factors related to belief in the paranormal is based primarily on survey literature using correlational data. Given the nature of correlations, it is very

difficult to determine whether concomitants of paranormal belief are consequent or antecedent to that belief [4], so the review of proposed causes that follows will therefore be somewhat speculative[5]. In this exposition, I shall adapt and expand upon Schmeidler's (1985) breakdown to organise accounts of the causes of belief in the paranormal into five general categories of explanation:

(i) Beliefs are a consequence of some form of cognitive deficit
(ii) Beliefs serve to fulfil some psychological need.
(iii) Beliefs are formed under the influence of a doctrine one accepts or of a person one respects. A weaker version of this is the casual acceptance of the attitude in one's cultural milieu, including that culture's media (books, newspapers etc..).
(iv) Beliefs are based upon careful analysis of research findings as presented in journals and other scholarly sources.
(v) Beliefs have their origin in impressive experiences which the person was unable, after consideration, to account for in terms of non-psi mechanisms.

(i) Cognitive deficits

Sceptical commentators have tended to characterise believers in the paranormal as being cognitively inferior to disbelievers (see, e.g., Alcock, 1981, chapter 3). Indeed, a sizeable proportion of the empirical work generated by sceptics has been devoted to exploring the nature of this supposed deficiency (see French, 1992, for a brief review). Irwin (1993) has coined the term "cognitive deficits hypothesis" to describe the philosophy behind this program of research.

Within this program, studies have investigated supposed differences between paranormal believers and disbelievers in educational attainment (Emmons & Sobal,

1981; Messer & Griggs, 1989; Tobacyk, Miller & Jones, 1984), science education (Otis & Alcock, 1982; Irwin, 1990; Tobacyk, 1983), performance on intelligence tests (Jones, Russell & Nickel, 1977; Killen, Wildman & Wildman, 1974), reasoning skills (Alcock & Otis, 1980; Polzella, Popp & Hinsman, 1975; Smith, Foster & Stovin, 1995; but see also Irwin, 1991, and Roe, 1995) and accuracy in probability judgements (Blackmore & Troscianko, 1985; Brugger, Landis & Regard, 1990). For each of these, however, the findings are inconsistent (Blackmore, 1994, summarises the relevant literature for the last-named; see Irwin, 1993, for a review of the others), and at best provide only equivocal support for the cognitive deficits hypothesis.

(ii) Psychological function

Irwin (1994) has described three[6] theoretical approaches to the nature of the psychological function that paranormal beliefs may perform. He refers to these as the psychodynamic functions hypothesis, the social marginality hypothesis, and the world view hypothesis. There is considerable overlap between these three accounts, in that they each provide a means of organising experience so as to make it sensible, understandable, and meaningful[7]. However, the approaches differ in their detail. Each will be briefly described.

The psychodynamic functions hypothesis has been suggested by Eisenbud (1970) and by Tart (1982) to account in particular for paranormal disbelief. It is unclear from this account what predictions may be made by this theory as to who should and who should not be strong believers in the paranormal, beyond stating that such

beliefs represent a response to some perceived psychological need and act to maintain or bolster psychological wellbeing. Even here, the little evidence accrued to date does not support the theory. Haraldsson & Houtkooper (1991) found no relation between paranormal belief and psychological wellbeing as measured by the Bradburn Affect Scale (Bradburn, 1969). However, this effect might not be so easy to interpret as running counter to prediction, since it may simply reflect individual differences in (i) perception of needs: some individuals may not have strong psychological needs and so may be psychologically well without needing to be a strong believer, and (ii) the efficacy of paranormal beliefs in repairing wellbeing: strong beliefs alone may not be sufficient to overcome particularly strong needs. Much further work needs to be conducted before the psychodynamic functions hypothesis can be satisfactorily evaluated.

Wuthnow (1976) has proposed an account of the origins of paranormal belief, which he terms the social marginality hypothesis. This predicts that the people most likely to hold paranormal beliefs are members of socially marginal groups. Magical or ultra-religious beliefs may serve as a compensation for hardship experienced by such groups by offering the promise of future rewards or retribution. Wuthnow (1976) has gone some way to identifying those sub-groups within which belief is predicted to be high. Although the theory is intuitively plausible, however, the empirical evidence is equivocal at best (see Emmons & Sobal, 1981; Irwin, 1993).

Thirdly, Irwin (1994) describes the world view hypothesis, which emphasises that belief in the paranormal is merely one aspect of a much broader world view that is characterised by a highly subjective and esoteric outlook. The model was proposed by Zusne & Jones (1982) but is only poorly specified, and Irwin (1993) has done most to expound it in terms of likely correlates. There is some support for the world view hypothesis in terms of correlations between paranormal belief and increased attention to subjective experience (Stanovich, 1989), attention to dreams (Haraldsson, 1981), fantasy proneness (Irwin 1990, 1991) and a tendency to meditate (Bainbridge, 1978; Palmer, 1979), However, until the theory is better articulated it is difficult to distinguish it from a simpler account in terms of the shared beliefs of a subculture (as proposed for example by Wuthnow, 1976, as an alternative to his marginality hypothesis).

(iii) Cultural milieu

Schmeidler (1985) has argued that one reason for disbelief is "a pronouncement against psi by a religious or other authority; disbelief in psi would follow from unquestioning faith in something else" (p. 3). Institutionalised science may offer just such a belief system, and this would generally be interpreted as pronouncing the non-existence of psi (see, e.g., Kurtz, 1988). This may provide us with a reinterpretation of the reported differences in level of belief between university professors, students and the general public (Otis & Alcock, 1982), which has generally been regarded as indicative of a simple relationship between belief and level of education. It could be argued that involvement in academe beyond graduate

level is concerned not so much with a furtherment of education as with one's assimilation into the scientific subculture. Any differences in proclaimed belief may be more likely, therefore, to reflect the norms of that social group (Irwin, 1989, has offered a similar interpretation).

Differences in level of belief across faculty, with students of the humanities being more believing than students of the sciences (Happs, 1987; McClenon, 1982; Padgett et al., 1981), may also be accounted for in terms of the demands of particular subcultures rather than as due to the latter's greater familiarity with the experimental literature, or awareness of the ways in which individuals can deceive themselves (as has been suggested, for example, by Padgett et al., 1981). We shall see presently that, in fact, scientists do not seem to be particularly familiar with the first hand sources of parapsychological research reports.

We might further expect that levels of disbelief would be greatest among those with the greatest investment in the prevailing subculture; among McClenon's (1982) selected AAAS members, who are regarded as representing an academic elite, only 29% were favourably disposed to ESP, while 50% considered it a remote possibility or an impossibility. The tendency to cite (unspecified) a priori grounds in support of one's belief, which is more common among elite scientists than other groups (McClenon, 1982) may also fit into this category, since it tends to involve a received philosophical system. Wagner & Monnet (1979) found that fewer respondents citing

this were positive towards ESP than those not citing it. It would be informative to explore further the nature of these a priori objections.

Beliefs may also be informed by the broader culture represented in media sources such as television, newspapers, and books. Wagner & Monnet's (1979) college professors referred to newspapers and magazines as a source of opinion, and elite scientists cited this source more frequently than any other group that has been polled (McClenon, 1982). It is unfortunate, however, that Wagner & Monnet did not have respondents indicate the nature of these sources (i.e. whether up- or down-market, offering popular or more detailed accounts of the field). Books by parapsychologists were a source for 22% of disbelievers and 25% of believers, although surprisingly no mention is made of books by sceptics and one might suspect that these are combined in the given figures, making them difficult to interpret.

(iv) On review of the experimental literature

Blackmore (1989) reported reading as the single largest reason why active researchers in her survey became interested in the field. When asked what they considered the most impressive evidence for psi, half referred to specific experiments in the literature. However, a number of skeptics (e.g. Alcock, 1981; Hansel, 1981, 1990: Hyman, 1989) have expressed dissatisfaction with the experimental literature, citing it as a cause of their *dis*belief, and some researchers, such as Blackmore (1988) and Irwin (1989), have also declared that they find the literature inconclusive.

Although Blackmore (1989) found no difference in the amount of relevant material read by parapsychologists and sceptics, the material did differ in type, with parapsychologists more familiar with their own journals, and sceptics with *The Skeptical Inquirer*. Wagner & Monnet (1979) similarly found that exposure to the empirical literature tended to polarise belief, which they interpret as reflecting the different sources that respondents had been exposed to. However, it may of course simply be that respondents choose reading material which accords with their pre-existing position rather than it playing any significant role in establishing that belief. Given the temperate prose style of scientific reports, which do not usually elicit strong reactions, it does seem unlikely that these individuals were so persuaded by the literature that it caused them to adopt an extreme position of belief or disbelief. Irwin (1989) has similarly contended that "dispassionate examination of the evidence and its conceptual status is surely not the basis for the vehemence and belligerence of sceptics' attacks on parapsychology" (p. 306).

Indeed, there is some doubt as to whether the empirical literature is actually read by the unconverted. McClenon (1982), for example, found that even with his sample of elite scientists, almost half reported themselves only 'slightly' familiar with the literature, and no significant relationship was evident between familiarity and level of belief. In this respect, McClenon replicated Wagner & Monnet (1979) in finding that psychologists are much less familiar with the literature than previous

generations; only 9 of the 351 responding scientists cited a parapsychological journal as a source of information.

(v) Personal experience

It seems likely that for some people, belief in some particular paranormal phenomenon is precipitated by an experience that they believe to be instance of it. Hyman (1979), for example, has claimed that "believers place overwhelming importance in [sic] the value of direct, personal experience. Whereas the skeptics distrust just this type of subjectivity and place more trust in indirect, objective assessments" (p. 423).

Indeed, there is moderate empirical support for the relative influence of experience upon belief. McClenon (1982) found that 54% of those who expressed a favourable attitude towards the reality of psi cited personal experience as influencing their opinion. According to McConnell (1975), even those scientists actively conducting research in the field of parapsychology, who are more aware than most of the objectivo-statistical support for the existence of psi, still declare that a significant proportion of their conviction in psi came from personal experience. A number of researchers have recently given graphic accounts of their own experiences which have helped shape their interest in and conceptualisation of paranormal phenomena (Braude, 1993; Targ, 1993; White, 1993)[8].

Among the general population, Blackmore (1984) reported that of the 36% who professed belief in ESP, 44% cited their own experience as the main reason. It has generally been found that personal experience correlates positively with belief in the paranormal (e.g. Glicksohn, 1990; Haight, 1979; Murphy & Lester, 1976; Shiels & Berg, 1977), and Irwin (1985) reports personal experience to be the primary factor loading on belief, irrespective of the breadth of the measure.

In terms of particular experience, Dutton (1988) has argued that "for many people, belief in the paranormal derives from personal experience of face-to-face interviews with astrologers, palm readers, aura and Tarot readers, and spirit mediums." (p. 326). Schouten (1993) has similarly suggested that outwith experiences of spontaneous psi, the major source of interest in the subject matter of parapsychology is through encounters with professional psychics. A number of commentators have argued that clients are impressed with the content of the readings they have solicited (see, e.g., Tyson, 1982). Hyman (1989: 346) has suggested that "millions of clients not only consult occult practitioners, but also wrongly believe in their claims". French et al. (1991) have assert that "most people who have their horoscopes cast perceive these horoscopes to be an accurate description of their personalities" (p. 166)[9], and Blackmore (1983) has claimed that "people who consult astrologers, palmists or Tarot readers often claim that the information they are given provides an accurate and specific description of their personality" (p. 97).

And this favourable impression of psychic readings is not thought to be restricted to a small subsection of the population. Carlson (1988) has warned (of astrology, although it would be fair to extend the warning to all readers) "It is not just an idle pastime, taken seriously by only a few. Astrology pervades our popular culture. It has captivated the imaginations of tens of millions and influenced decisions of great import" (p. 290). Aphek & Tobin (1989) echo this sentiment when they assert that "visiting an astrologist has become more than merely a casual, entertaining experience." (p. 7). Attempts to account for the success of psychic readings (e.g. Hyman, 1977, 1981) often implicitly assume that clients take their readings very seriously.

There are anecdotal accounts which suggest that some individuals do make a deep commitment to their psychic reader, both financially and behaviourally. Feder (1990), for example, recounts instances in which very large sums of money (in excess of $250,000 in total) were paid out to fortune tellers to assist in warding off evil. Boles et al (1983) provide a dramaturgical account of the ways in which fortune tellers were able to encourage individuals to become regular clients (known as "repeaters" or "38's"). By demonstrating that the sitter's predicament was due to a curse or 'bad luck', the readers were able to cause them to become increasingly involved as they provided prolonged - and expensive - 'treatment'. Keene (1976) provides a telling insight into the manner in which psychic readers are able to procure large sums of money from their clients. Hoebens (1981) describes how a psychic identified an innocent man as the murderer of a young boy. Relatives of the

boy were so convinced by the reader's testimony that they kidnapped and tortured the suspect in order to extract a confession.

There is some empirical evidence to suggest that encounters with psychic readers are typically regarded as quite impressive. Haraldsson (1985) found that of those who had attended a seance, a surprisingly high 83% had found the experience 'useful' [10], whereas 28% of those who had visited a 'prophesy-psychic' found it useful. With Palmer's (1979) Student sample, evaluations of the readings are similarly quite favourable, as 67% found the experience to have been very helpful, 22% somewhat so, while 78% claimed to have acted on the advice. None reported the experience to have been harmful. For Palmer's (1979) Townspeople, 15% found the reading very helpful and 30% somewhat helpful. However, 52% found the experience of no help, and 3% reported it to have actually been harmful.

Palmer gives a very interesting and detailed breakdown of the impact of psychic experiences generally upon his respondents' lives, focussing particularly on effects upon their 'feelings or attitudes', and important life decisions that they had made. On the basis of Palmer's analysis, it does appear that psi has had profound consequences for some. For example, an astounding 9% of respondents claimed that their experiences had saved them in a crisis, and a further 9% that someone else had been saved as a result of their experience. Unfortunately, Palmer's breakdown does not identify the different types of experience which gave rise to the various effects. It would be informative to see, for example, whether psychic readings have altered Ss

perceptions and / or actions in important ways. The present study is designed to provide a more direct and more detailed estimate of the incidence and impact of psychic readings.

2.1.3 Causes of paranormal disbelief

It has less frequently been argued that prior experience could be a contributory factor to paranormal *disbelief*. Indeed, I am not aware of any comparable figures to indicate whether or not skeptics have been equally swayed by personal experiences, which in their case may have suggested that psi did not exist or that its effects were pernicious. However, Alcock (1981) has reported that 35% of the skeptics he surveyed cite a *lack* of personal parapsychological experience as a reason for their disbelief, and McClenon (1982) found that more believers reported having experiences of ESP than did sceptics.

Of course, it is likely that sceptics are in some way predisposed to attribute normal causes such as coincidence to those experiences which may be seen as parapsychological by others (cf. Irwin, 1989). Alcock (1985, p. 36) admits that lack of personal experience may only be a post hoc rationalisation of paranormal disbelief rather than an effective cause of it. Yet Irwin (1985) found that even where respondents were questioned about their experiences in a neutral manner (i.e. in a way that did not imply a paranormal cause), believers still had more experiences that might be regarded by some as instances of psi than did non-believers (e.g. for 'telepathy' 69% versus 13% of the sample reported at least one such experience). One

plausible account of this discrepancy, proposed by Zusne & Jones (1982), argues that believers are more likely to attempt to induce a paranormal experience (e.g. by organising a Ouija session, or seeking a psychic reading) in the first place, so that we perhaps should not be surprised that they subsequently report more events. Unfortunately, they do not offer any evidence in support of this account, and their suggestion offers a promising direction for future research.

However, it does seem more likely that the simple lack of paranormal experiences would lead to a neutral or ambivalent stance towards parapsychology rather than the unease and vehement scepticism that is often associated with the subject (see Hansen, 1992; Irwin 1989). McClenon (1982) nicely illustrates this stance when he notes of his respondents that "Some professors became anxious when they realised that the questionnaire involved parapsychology. Thinking of this field seemed to create an unverbalised tension in them" (p. 130). Alcock (1981) provides a telling insight into his own attitude towards psi by his choice of analogy:

> Thousands of research reports and monographs and books attest to the strength of the evidence [for parapsychology], but thousands of books and documents attested to the reality of Satan, and I am not persuaded by either. (p. ix)

One potential cause of this strong reaction against paranormal claims is suggested by the manner in which some skeptics have sought to disabuse others of their belief (e.g. Morris, 1981; Singer & Bennassi 1980). Here subjects are enticed to believe in psi by being presented with demonstrations of paranormal phenomena, but after publicly registering their belief, participants are then subjected to some degree of

ridicule or embarrassment when these demonstrations are exposed as a result of conjuring or the exploitation of psychological effects[11].

It may be worthwhile to speculate that this represents a better analogy for the origination of paranormal disbelief than was intended; for some individuals, negative feelings or values may be attached to ostensibly paranormal phenomena that are associated with negative events or experiences that the individual has had (such as, for example, being given advice by a psychic reader which turned out to be ill-judged). In this respect, it is worth reflecting on Palmer's (1979) finding that 3% of his Townspeople sample found the experience of attending a psychic reading to be harmful. This may be one source of the "very strong unconscious emotional conflict" referred to by Irwin (1989: 309). Hansen (1992) interestingly notes that "a number of [CSICOP] members apparently once held strong religious or paranormal beliefs but later became disillusioned" (p. 34). This suggestion is not inconsistent with the finding that scepticism towards parapsychological research tends to be associated with increased fear of psi (Irwin, 1985), and with a greater belief that its study is in principle illegitimate (McClenon, 1982).

2.1.4 Consequences of belief

Less well documented is the impact that paranormal beliefs have upon the respondent, particularly in terms of their subsequent behaviour. Irwin (1993) has suggested that this may be because the association between paranormal beliefs and involvement in practices associated with the paranormal (such as attending psychic

readings) "may be so predictable as to be uninteresting" (p. 12). However, the association need not be so obvious or trivial as is first supposed, since it makes assumptions about the relationship between Ss' proclaimed belief, their depth of commitment to that belief, and the behavioural consequences which are thought to follow. The directness of this relationship is made dubious by consideration of the following factors.

2.1.4.1 Admitted attitudes can be very context sensitive

Schmeidler (1985) has described how the proclaimed beliefs of some Ss are easily influenced by context, either in the form of earlier questions in a battery or in terms of the perceived attitude of the experimenter. Estimates of the extent of paranormal belief seem to be sensitive even to the type of scale used to record responses (Gray, 1990; Grey, 1988).

Schmeidler (1985) has recounted one case in particular in which she and a shy undergraduate student performed the same assessment procedure on Ss; in her half only about 5% denied that ESP could occur in the experiment, whereas for the undergraduate, over 50% did. Crandall (1985) manipulated this variable more formally, and found that in the control or baseline condition, 48% of Ss classed themselves as sheep[12], 38% were undecided and only 14% of goats, whereas when the test was administered by someone who was only 'substituting' for the experimenter, and who was uninterested in - even hostile towards - the topic, the proportion of sheep dropped to 8%, and that of goats increased to 72%. Layton &

Turnbull (1975) have similarly demonstrated that respondents' proclaimed belief in and evaluation of paranormal phenomena can be influenced - indeed this was part of their experimental manipulation. Courses which explicitly set out to debunk do appear to reduce claimed levels of belief (e.g. Banziger, 1983; Gray, 1984, 1985, 1987; Tobacyk, 1983). Irwin (1985) failed to induce differential belief, but the manipulation he used was rather subtle; Ss were provided with an account of an event which could be interpreted as either paranormal or as due to normal causes. Some Ss were given a version which included further cues designed to prime them for a parapsychological explanation, whereas others received further indications that a normal explanation was appropriate. This form of manipulation doesn't explicitly convey the experimenter's own viewpoint so would probably be less effective in inducing demand characteristics.

It may be that these studies are simply measuring acquiescence, with the manipulation only successful in modifying respondents' *reported* beliefs rather than having any lasting effect upon their actual attitudes (Irwin, 1993). However, the distinction is moot, since our primary source of knowledge about respondent beliefs is derived from such self-reports. Without sources of concurrent validity we can never be sure that we are measuring anything more than Ss attempts to conform to the experimenter's expectations. Behavioural parameters (such as the respondent's tendency to visit psychic fairs, to attempt to induce psychic events, to read about psychic phenomena etc..) offer one such source.

2.1.4.2 Attitudes are not all or nothing

There can be different degrees of commitment to a belief, to the extreme of respondents never having given the topic much thought until confronted with a questionnaire. Schmeidler (1985) has commented that ESP is for many the kind of topic "that is not salient in the listener's thinking, a topic that has never been examined so thoroughly as to lead to a firm conclusion" (p. 2), and McClenon (1982) in his study of elite scientists found parapsychology to be a "subject matter [that] was not one to which the average professor had given much thought" (p. 130). Conventional measures of belief are unable to differentiate between long-standing attitudes and 'surface' ones formed at the time of testing.

Respondents may also differ in the degree to which their paranormal beliefs are central to their world view so that, for example, they may believe in psi very strongly, yet not believe that it has much impact on their own daily lives (i.e. 'psi is a real phenomenon but its effects are weak to the point of triviality') (see Fishbein & Raven, 1967; Singer & Benassi, 1980). The reverse position could also plausibly be held by some respondents, in which the individual believes that psi doesn't really exist, but if it were to exist it would pervade all aspects of our life. Alcock's (1981) startlingly pessimistic picture of a world with ESP may reflect such a position

> But what chaos we would have. There would, of course, be no privacy, since by extrasensory perception one could see even into people's minds. Dictators would no longer have to trust the words of their followers; they could "know" their feelings. How would people react if they could catch glimpses of the future? How could the stock market function if traders could use precognition? If most people could foresee the future, how would life be with millions of people all attempting to change present circumstances so as to optimize their personal futures? What would happen when two adversaries each tried to harm the other via PK? The gunfights of the Old American West would probably pale by comparison. (p. 191).

2.1.4.3 Attitudes are complex

In social psychology, attitudes are often conceptualised as consisting of three components (e.g. Stahlberg & Frey, 1988) representing affective, cognitive and behavioural aspects, as first suggested by Rosenberg & Hovland (1960). Traditional surveys tend to focus on the cognitive component to the neglect of the others, which may obscure some of the relationships between attitudes and their concomitants. For example, Fishbein & Raven (1962) reported that patterns of response to measures of belief in and evaluation of paranormal phenomena may actually be orthogonal, with the latter being the better predictor of performance on a psi task. Singer & Benassi (1980) provide some support for this separation of cognitive and affective components of attitudes toward paranormal phenomena. They cite one subject who said "I am a Christian and I feel strongly that ESP or anything dealing with that is of Satan. Yes, I believe it could happen, *but* I, being a Christian, will have *no* part of it.". (p. 23, italics theirs). It seems likely that there will likewise be individuals who do not believe that psi is real but who feel that the world would be a better place if it were.

Just as belief and evaluation components may not tally, so proclaimed belief may not be a good predictor of behaviour. The classic example of this is LaPiere's (1934) investigation of prejudice against Asians in America, in which he found that a young Chinese couple were served at all but one of over 200 hotels, motels and restaurants

when they arrived in person, but would have been refused by 92% of these if they had asked in advance whether or not they would accept a Chinese couple as guests.

We may suspect, then, that there need not be a direct link between paranormal belief and involvement in practices associated with paranormal phenomena. High proclaimed belief in itself may not be a very good indicator of the importance of the concepts to the respondent if it is taken in the absence of information about how they evaluate the phenomena and what practical consequences belief has for them. Indeed, behavioural parameters promise to provide more reliable single measures of the importance of the belief to the respondent and are less susceptible to particular context effects. These may represent more accurate estimates of the proportion of the population for whom belief in the paranormal represents more than a trivial or peripheral belief. This is considered in the next section.

2.1.5 Measures of behavioural consequences of belief

Irwin (1993) has summarised the few studies which have investigated the effects of paranormal belief upon behaviour, and reported that moderate to high global belief may prompt an individual to seek entertainment that has a paranormal theme (Otis, 1979), read about paranormal or psychic phenomena (Irwin, 1985; Shiels & Berg, 1977); participate in courses on parapsychology or psychic development (McGarry & Newberry, 1981; Neppe, 1981; Roney-Dougal, 1984); use mind-expanding drugs or other techniques to induce an altered state of consciousness (Roney-Dougal, 1984); and practice as a medium or psychic (McGarry & Newberry, 1981).

Notwithstanding these few exceptions, the behavioural aspect of paranormal belief remains relatively under-researched. Two behaviours which would seem to have a more direct link with paranormal belief, and which may therefore be particularly promising, are reading about paranormal phenomena and visiting psychic readers. These are considered in more detail here.

2.1.5.1 Reading about psychic phenomena

Respondent's reading habits have been considered in relation to paranormal belief by a number of researchers. Not surprisingly, believers have consistently been found to be more likely to read about paranormal phenomena (e.g. Irwin, 1985; Shiels & Berg, 1977). Reading habits are usually gauged using item three of the Icelandic scale (Haraldsson et al, 1977) which asks: *do you read books or articles on psychic phenomena (1) never, (2) seldom, (3) now and then, (4) often*? Unfortunately, the item is ambiguous, measuring motivation rather than perspective. Committed sceptics would also have read numerous books concerned with psychic phenomena, just those written by, for example, Martin Gardner, James Alcock, or Ray Hyman[13]. The relatively high positive correlations between this item and others in the Icelandic Scale (which do not suffer from this ambiguity) do tend to allay this fear somewhat, but as yet we can not be sure that this constitutes a reliable measure of paranormal belief *per se* rather than a measure of polarity pro *or* con.

2.1.5.2 Seeking professional psychics

Surprisingly little studied is the likelihood that a believer in the paranormal will visit a psychic reader. This is despite the fact that much of the experimental research with psychic readers is underpinned by the assumption that a considerable proportion of the general public has attended a psychic reading of some sort, and that such experiences constitute evidence of psi. A number of commentators have argued that psychic readings are well-attended. Richards (1990: 274), for example, has noted that "consultation with a psychic for personal counselling is perhaps the primary application of psi in our culture", and Aphek & Tobin (1989: 7) have suggested that there has been "an upsurge in the interest of the general public in Israel, and, we believe, in other parts of the world as well, in varous kinds of fortune-telling, faith healing and the occult". Indeed, Carlson (1988) offers the rather alarmist estimate that there are between 1 and 10 thousand full time astrologers (quite apart from other types of psychic consultants), with a further ten part-timers and fifty serious students to every one of these.

However, surveys which have touched on this issue provide a more muted portrayal. Gallup & Newport (1991) report that 'only' 14% of a national sample (N = 1,236) had consulted a fortune teller or psychic. Palmer (1979) found that 10% of his Townspeople sample (N = 357) had sought a psychic, of whom 72% had done so more than once. For his Student sample (N = 267) only 3% had visited a psychic, of whom 38% had attended more than once (*none* had seen more than one reader). Unfortunately, because of the wording of the item, we don't know what respondents

understood by 'psychic'. It is possible that the incidence may be overestimated as affirmatives include those who have had a Tarot reading from a friend, or attended a Spiritualist Church, for example. Haraldsson (1985) found that of his Icelandic sample (N = 902), 32% had attended a seance, and an astounding 52% had visited a 'prophesy-psychic' (71% of women compared with only 31% of men). Just 3% had visited an astrologer. This may reflect cultural differences between countries, as only 11% of his British sample had attended a mediumistic seance, which is more in keeping with Gallup & Newport (1991) and Palmer (1979). Zusne & Jones (1982) report the percentage endorsement of different beliefs (in which respondents need not necessarily have had personal experience in order to endorse the practice) obtained from a student sample (N = 92). They give figures of 6.5% for fortune telling, 3.3% for palmistry and 3.3% for Tarot cards. However, given the small sample size, these figures amount to only 6 and 3 people respectively, and are likely to be too few to provide reliable estimates.

Unfortunately, the surveys discussed thus far have only been capable of providing relatively crude measures such as incidence of attendance; they tell us nothing, for example, about why respondents choose to attend a psychic reading, how they decide on the type of reader to visit, what kind of material they expect to be presented with in the course of the reading, and what kind of impact the experience has had upon them. More detailed investigation would be helpful in determining whether attending psychic readings represents anything more than a casual activity, engaged in for

entertainment or other social purposes. This study is designed to go some way to resolve these issues.

2.1.6 General shortcomings of existing survey research

Blackmore (1984) has criticised survey research on belief for failing to use established random sampling techniques[14], particularly in being dependent upon opportunity samples of students with little assurance that findings will generalise to the population as a whole. It is conceivable that student samples may differ systematically from the general population along important parameters, by virtue of their restricted range in terms of, for example, age, intelligence, and socioeconomic status. This may extend to paranormal beliefs; Palmer (1979) found slightly different patterns of belief between his student and general samples, although this difference was not explored in any detail.

Although useful data can be generated with restricted samples where circumstances or resources are limited (so long as this limitation is recognised), more valid and reliable population estimates can only be achieved by adhering to standard sampling techniques. A number of important methodological issues must be carefully considered before one can decide upon an appropriate survey protocol, and thus ensure that the data generated can tell us anything meaningful about the population from which it was drawn. These issues are presented in detail in Chapter 3, so as not to distract from the theoretical and empirical objectives of the study described here.

It is particularly disappointing to note that those studies which have used appropriate sampling methods have usually been primarily concerned with other topics (e.g. Haraldsson, 1985; Haraldsson & Houtkooper, 1991) and so contained only a limited number of relevant items, or adopted questions which were poorly worded, so limiting their informativeness. Haraldsson & Houtkooper (1991), for example, comment on the ambiguity of the three parapsychological items contained in their survey. We share their lack of confidence that these items truly do gauge experiences of telepathy, clairvoyance and contact with the dead as the authors intended. The first item, for example, merely asks if respondents had 'felt as though you were in touch with someone when they were far away from you'. There are numerous mundane experiences which could lead the respondent to answer 'yes' to this. If parapsychologists intend to continue to generate survey data, it is essential that this work should combine the use of established sampling techniques (to ensure representativeness) with sufficient control of questionnaire format (to ensure that meaningful answers can be supplied to the research questions posed) rather than opting for one or the other.

2.2 Aims / hypotheses

This study was designed to use standard survey techniques to explore the extent to which the target population becomes involved in practices associated with the paranormal, in particular characterising behaviour and experiences related to professional psychics. It was also intended to gauge how influential such experiences are upon the clients' attitudes and outlook as well as upon important decisions they

have made in their lives. The study also offered the opportunity to determine whether the commonly-used Icelandic scale item relating to reading habits may present a distorted impression of the extent of paranormal belief in a given population.

2.3 Method

2.3.1 Subjects

Subjects were drawn from the universe of Edinburgh district residents, using the Lothian Region City of Edinburgh District Register of Electors as source. A representative sample of 1,000 residents was selected using a pseudo-simple random sampling technique (Moser & Kalton, 1971), stratified by electoral ward (to effectively control for socio-economic status). Edinburgh District is divided into 32 divisions consisting of a total of 62 wards which in turn contain a total of 151 districts. Electors are individually numbered within districts, and are arranged by residence addresses. The number of electors contained in each division was determined and a proportional sample drawn pseudorandomly by taking a random entry point and selecting every nth person thereafter, where n was such that the appropriate number of Ss were taken[15]. More detail of the factors pertinent to subject selection are presented in the supplementary chapter on methodological considerations.

2.3.2 Materials

A questionnaire was designed especially for the purposes of this study. A copy is included as an appendix. Section 1 consisted of a modified version of Thalbourne's Revised Australian scale (Thalbourne & Delin, 1993), adapted for use with a population of average intelligence and minimal familiarity with questionnaires. These changes took two distinct forms; Firstly, Thalbourne's visual analogue (VA) scale (i.e. placing an 'x' at a point along a line joining the two extremes - see Figure 2.1) could be confusing for respondents who are not used to completing questionnaires, and who may not be aware of the intended direct relationship between length measurements from the poles and strength of belief.

1.

I am completely convinced that ESP does not exist.	I am completely convinced that ESP exists.

Figure 2.1: Example item from Thalbourne's Australian Scale

This problem is exacerbated by the text "spilling over", underwriting a large proportion of the line (where should one place an 'x' which is in agreement with the sentiment, at the line pole, at the left edge of the text, or at the centre of the text?) In any case, the presumed advantage of the VA method, that responses will be more parametric, seems highly suspect - how can we have any confidence that absolute differences in the positioning of 'x's is meaningful? Instead, Ss' in this study were presented with a statement (all representing the sheep end of the scale since the goatish statements seems to have been created by negating these) to which they

responded using a 6-point[16] Likert scale to indicate degree of agreement. This represents a standard form of presentation of questionnaire items, which is easy to interpret, and results in only a small loss of power (cf. Kline, 1986).

Secondly, the phrasing of some items is rather unsatisfactory. While accepting that Thalbourne & Delin (1993) are merely attempting to remove any ambiguity in the statements to afford more straightforward subsequent analysis, it does result in items which are likely to be unfathomable for normal respondents (i.e. outwith the usual undergraduate population). For example, students were presented with the statement:

> **I am completely convinced that it is impossible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on rational prediction or normal sensory channels.**

Thus some of the items were modified to make them more readily understandable for people of average intelligence. The switch to a Likert scale necessitated the omission of the word 'completely' from all statements.

> **It is possible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on common sense or the 'normal' senses (sight, hearing, etc).**

1	2	3	4	5	6
Strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	Strongly disagree

Section 2 contained a set of questions exploring the respondent's experiences of psychic readers, including items asking about the frequency with which they visit

psychics, about the type of reader visited and reasons for attending, as well as about the accuracy and utility of information provided. Two questions were adapted from Palmer (1979) to gauge the influence of the content of the reading upon the respondents feelings or attitudes towards themselves and their circumstances and upon subsequent important decisions made in their lives.

Section 3 asked for general demographic information, particularly variables implicated in belief by the social marginality hypothesis (see Emmons & Sobal, 1981). Items were concerned with the respondent's sex, age, marital status, and religiosity. Three further questions were included to gauge respondents' reading habits. The first of these was the standard Icelandic item (Haraldsson et al, 1977), with follow-up questions asking about the type of reading matter, and its orientation towards parapsychology.

2.3.3 Procedure

A pilot study was conducted using 10% of the sample selected pseudo-randomly from the subject pool in order to assess the adequacy of the questionnaire. An initial questionnaire was posted along with a stamped return envelope and a cover letter describing the purpose of the study and encouraging their participation. Three weeks later, a second questionnaire was mailed, again with stamped-addressed return envelope, and a second cover letter. A similar procedure was followed for the survey-proper.

In the light of rather disappointing return rate for the pilot (see table 3.2), the questionnaire used in the full survey was a shortened version of that used there, to encourage Ss to complete and return it. Thalbourne's scale was reduced from the original 18 items to 6. The original scale gives rise to 3 factors (see Thalbourne & Delin, 1993), which have been termed belief in and experience of ESP, belief in and experience of PK, and belief in life after death and the possibility of contact with spirits. The abbreviated scale was generated by retaining only the two highest loading items on each of Thalbourne's three factors, with the qualifier that the second highest loading item needed to be conceptually dissimilar from items already selected. Items selected on this basis are 2, 15, and 10, and 12, 17 and 9. Scores on this abbreviated scale were reasonable predictors of full-scale scores for pilot data (r_s = .934, accounting for 87.2% of the variance).

All other items relevant to the current analysis were able to be retained[17]. The cover note was expanded a little to emphasise that we were interested to hear from all targetted individuals whether or not they had had the kinds of experiences listed. To gather further information about non-respondents, the experimenter's address was now stamped on the outer envelope to allow mailings to be returned where the target individual was unreachable. These non-respondents can validly be removed from the sample since they have had no opportunity to respond (Palmer, 1979, for example, re-sampled in cases where a subject was unable to be contacted, but did not where Ss indicated an unwillingness to cooperate by returning the form uncompleted).

2.4 Results and discussion

2.4.1 Returns

Twenty-one usable forms were returned from the first mailing. However, 8 forms were returned unopened by the postal service because (i) the person was not known at that address, (ii) they were no longer at that address, or (iii) they were deceased. This gave a disappointing return rate of 23% (21/92)[18]. A further 4 usable forms were received as a result of a second mailing to give a total return rate of 27.2% (25/92)[19].

A breakdown of returns from the study proper is given in table 2.2.

			to be removed from sample				
	Total N (effective N)	Returns	Not known at address	No longer at address	Deceased	*Total*	Refused
1st Mailing	900	180	21	67	4	*92*	5
2nd mailing		72	7	6	0	*13*	10
Totals	900 (795)	252 (31.7%)	28	73	4	*105*	15

Table 2.2: Breakdown of returns from the survey proper

A surprisingly large number of the sample was unobtainable, because they were not known at the address, had recently moved, or were now deceased. This accounted for 113 individuals. This may in part be due to the universe being sampled just prior to the electoral register being updated, which effectively meant that the address list was approximately 18 months out of date. As the home of three universities, Edinburgh has a large student population who do tend to move frequently and this may have

compounded the problem. Of the remaining 887 individuals, returns were received from 278, which translates as a return rate of 31.34%. Although not as high a return as was hoped, this figure is well within the range expected for mail surveys (see Fowler, 1993; Moser & Kalton, 1979).

Respondents who replied to the initial mailing were compared with those who replied to the follow-up to see if they differed systematically. If they do not, this gives us more confidence that non-respondents may similarly not differ meaningfully from respondents (see Blackmore, 1985; Palmer, 1977). It was found that there was no difference in level of paranormal belief between first- and second-mail respondents [$t = .70$, 275df, $p > .5$], neither did they differ in incidence of having visited a psychic reader at least once [$X^2 = 1.79$, 2df, n.s.].

2.4.2 General level of belief in the paranormal

Figure 2.2 summarises the distribution of level of paranormal belief among respondents. Higher ratings indicate greater belief in the phenomena described in the questionnaire, with possible scores ranging from 6 (wholly disbelieve in all described phenomena) to 36 (wholly believe in all described phenomena).

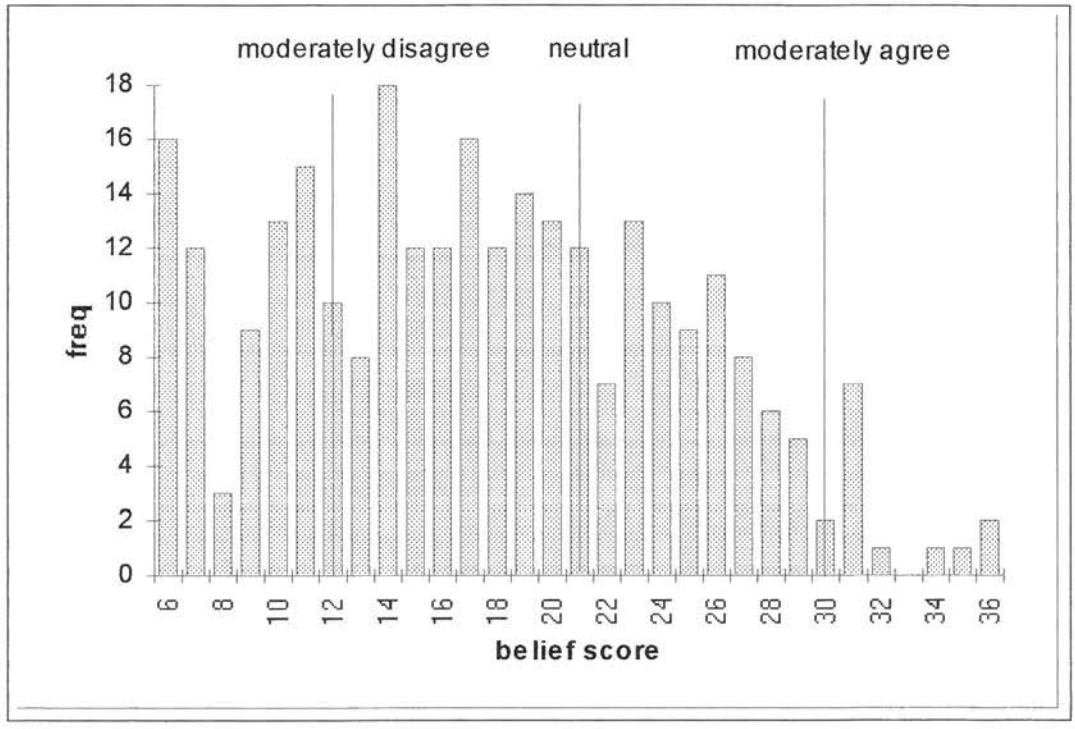


Figure 2.2: Frequency distribution of respondents' belief scores

From the distribution, it seems apparent that this was not a particularly believing sample, contrary to the expected response bias which suggested that believers may be over-represented in returns. The sample mean is actually 18.81 which is below the scale midpoint of 21, but not significantly so [Wilcoxon Z = -1.3992, p = .1618].

2.4.2 Incidence of visiting a psychic reader

Respondents were asked to indicate, by checking one of six options, the frequency with which they had attended readings given by professional psychics. The options, and the distribution of responses (in terms of absolute numbers) are given in Figure 2.3.

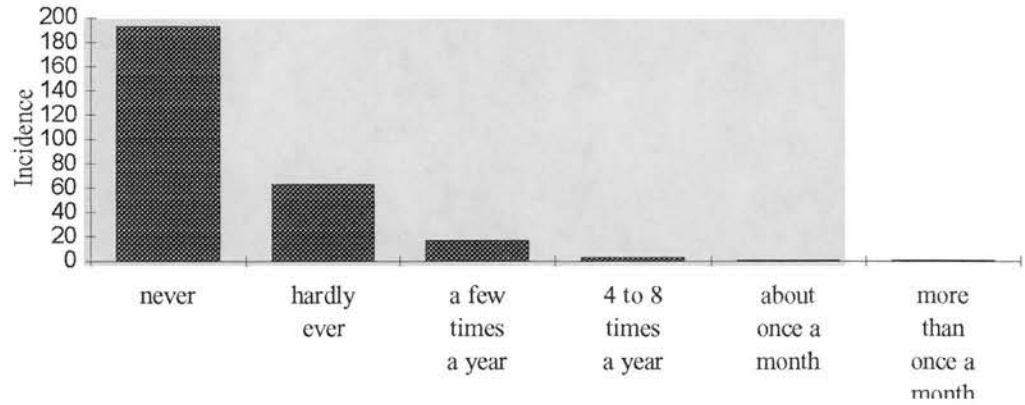


Figure 2.3: Reported frequency of visits to professional psychics

Although 85 respondents indicated that they had visited a psychic, only 82 completed the section on psychic visits and this more conservative figure is adopted here. This indicates that 29.5% have attended at least one psychic reading. This figure is surprisingly high given the fairly consistent estimates of Gallup & Newport (1991), Haraldsson (1985) and Palmer (1979) which all suggest a figure in the region of 10-15%, although it is in keeping with frequencies reported in Haraldsson's (1985) Icelandic sample. It may be, of course, that this simply reflects a response bias in favour of those who have had the types of experience being asked about.

However, no evidence of such a bias was found between first and second mail respondents in the form of differences in belief and attendance levels.

It is worth noting that the majority of individuals who visit readers do so only infrequently. Very few (1.2%) could be classed as 'repeaters' (see Boles, Davis & Tatro, 1983), attending once a month or more. Perhaps not surprisingly, stronger believers are more likely to attend readings and do so more frequently than disbelievers [$r_s = .44$, $N = 278$, $p < .001$]. But although this effect size is medium to large (cf. Rosenthal & Rosnow, 1991, p. 444), the relationship accounts for only 19.3% of the variance, suggesting that other factors may play an important mediating role. For example, there is quite a strong tendency here for more females than males to attend psychic readings [$X^2 = 21.41$, 1df, $p < .001$].

2.4.3 Description of psychic reading habits

Blackmore (1985) has made the point that "much can be learned from simple percentages and the results displayed as tables of percentages, pie charts or histograms. Indeed for some purposes no further analysis is needed" (p. 8). Much of what follows adopts this maxim.

One question of interest is the extent to which respondents express a preference for one type of psychic reading over another. Figure 2.4 gives a breakdown of visits by reader type.

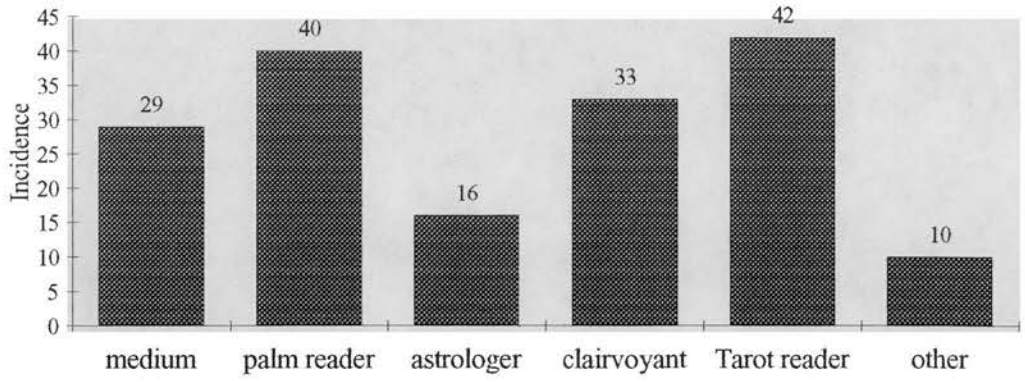


Figure 2.4: Breakdown of visits by type of reader[1]

All five types of reader listed seem to be well supported, although it is perhaps surprising to note that astrologers are the least popular here with only 19.5% of those who attend readings visiting astrologers. Yet this figure is still much higher than the 3% reported by Haraldsson (1985). This compartmentalisation of readers may be rather artificial, as psychics often offer a variety of divination techniques so that labelling may be somewhat arbitrary - although respondents were free here to check more than one category should they apply. Mediumistic readings are likely to be an exception to this general overlap, however, and it is interesting to note that the particular service offered by mediums is still popular, used by 35.4% of clients and responsible for 17% of all visits.

Figure 2.5 details respondents reasons for choosing a particular reader. Despite clients not visiting readers very frequently, they do appear to remain faithful to the same psychic, with 16% of respondents visiting the same reader they have used

before. This could be interpreted as reflecting some degree of personal validation of the psychic's claims, or at least suggests that they are able to provide a service that the client requires (e.g. as a counsellor) irrespective of the paranormality of the communications.

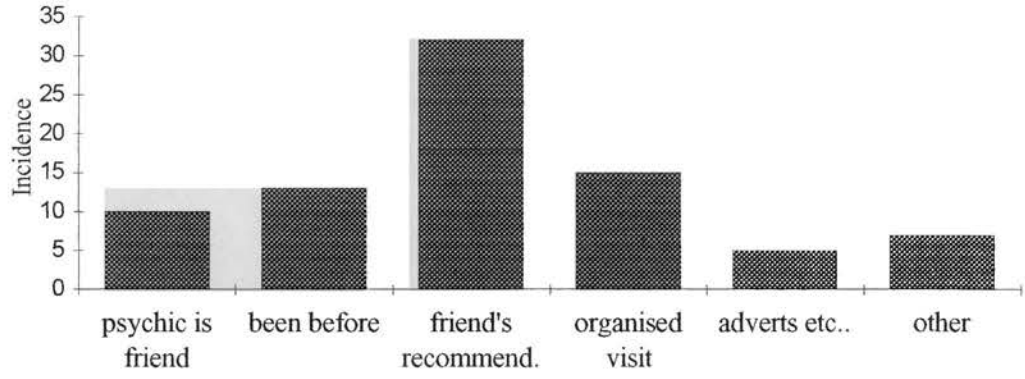


Figure 2.5: Reasons for selecting type of reader

Similarly, attending a particular reader on the recommendation of a friend would seem to imply that the initial reading had been perceived as 'successful'. Otherwise, choosing a reader to visit seems to be a socially determined choice, with respondents acting on the recommendation of friends, actually visiting with friends, or regarding the psychic him/herself as a friend. It seems to be quite unusual for a client to select their reader through adverts (only 6.2% checked this option). It should be noted, however, that respondents were asked to select only one option, even though the choices offered need not be mutually exclusive. We can only be confident, then, that

these figures reflect the usual or preferred option rather than capturing every behaviour.

Pseudopsychic manuals (e.g. Martin, 1990) draw attention to the availability of information about the client when readings are given in their home. However, it appears (Figure 2.6) that it is rare for people to solicit readings to be given in their own home. Apparently, it is most common for respondents to visit the reader for personal readings. However, the social theme is again evident, with 16.0% having their reading at a group meeting such as organised by Spiritualist churches, or as a member of a party of friends gathered specifically to sit with the reader. It is unfortunate that the questionnaire did not ask respondents to specify the form that 'readings as a party with friends' would take, in particular whether these would be held at the home of one of the party or at the reader's. My own interaction with professional psychic readers, such as Malcolm Davidson, suggests that the former is more common.

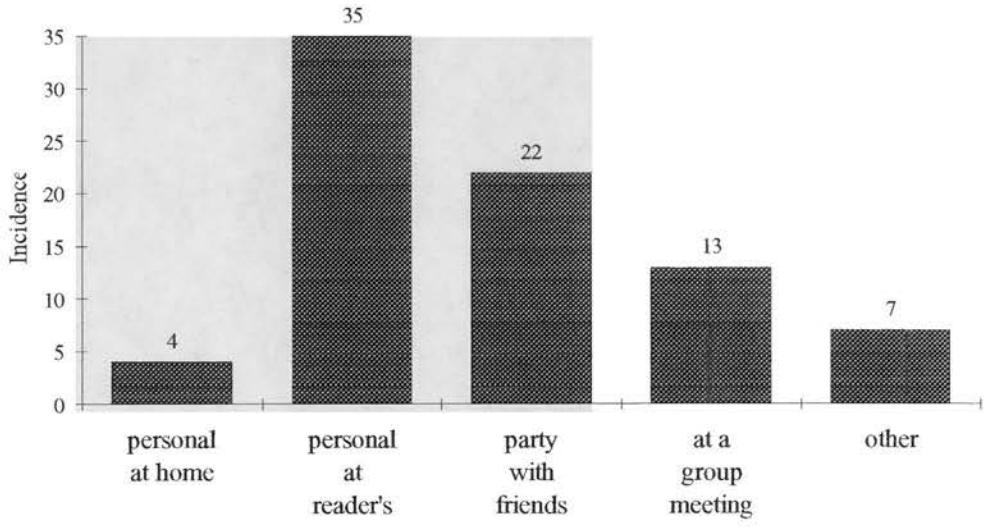


Figure 2.6: Setting for psychic reading

It is also of interest to determine what caused the client to attend a reading in the first place. A breakdown of responses to this item is given in Figure 2.7.

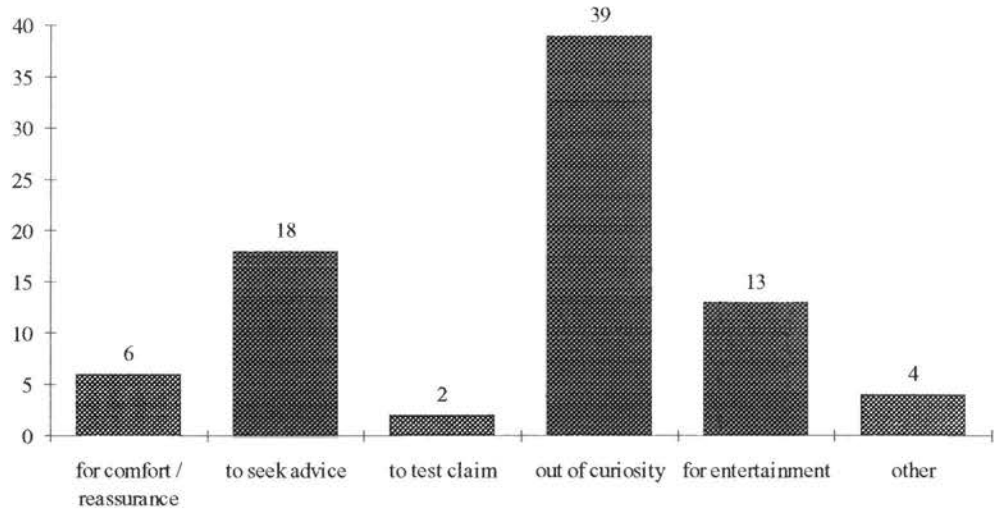


Figure 2.7: Reasons for attending a psychic reading

Perhaps surprisingly, respondents reported that they did not attend readings expressly to test the reader's claim to have psychic ability (only 2.4% checked this option). Almost half the clients here (47.6%) attended just out of curiosity, and a further 15.8% went primarily for entertainment purposes. However, a notable minority (29.3%) treat the reader's claim seriously enough to attend expressly for comfort or guidance.

2.4.4 Evaluation of readings

Whatever their reason for attending, it seems that clients are generally satisfied by the content of their readings (see Figure 2.8). Over half of respondents (57%)

regarded their reading as quite accurate or very accurate, with a further 23% unsure. Apparent accuracy may be explained in terms of the Barnum Effect (see Roe, 1991, 1995), in which vague or general readings are regarded as accurate by almost all people. In this case, however, over half the sample (52%) felt that their readings were at least quite specific, whereas less than a third thought they were vague. Further, those readings regarded as most accurate also strongly tended to be those which were seen as most specific [$r_s = .97$, $p < .001$]. This suggests that for at least some respondents, readings they have solicited are regarded as generally impressive, containing information which was both specific and accurate. This stands in contrast to the experimental findings of Boerenkamp (1988) who found that when these factors are taken into account, professional psychics who attempted to give readings for their clients were only able to perform at chance levels.

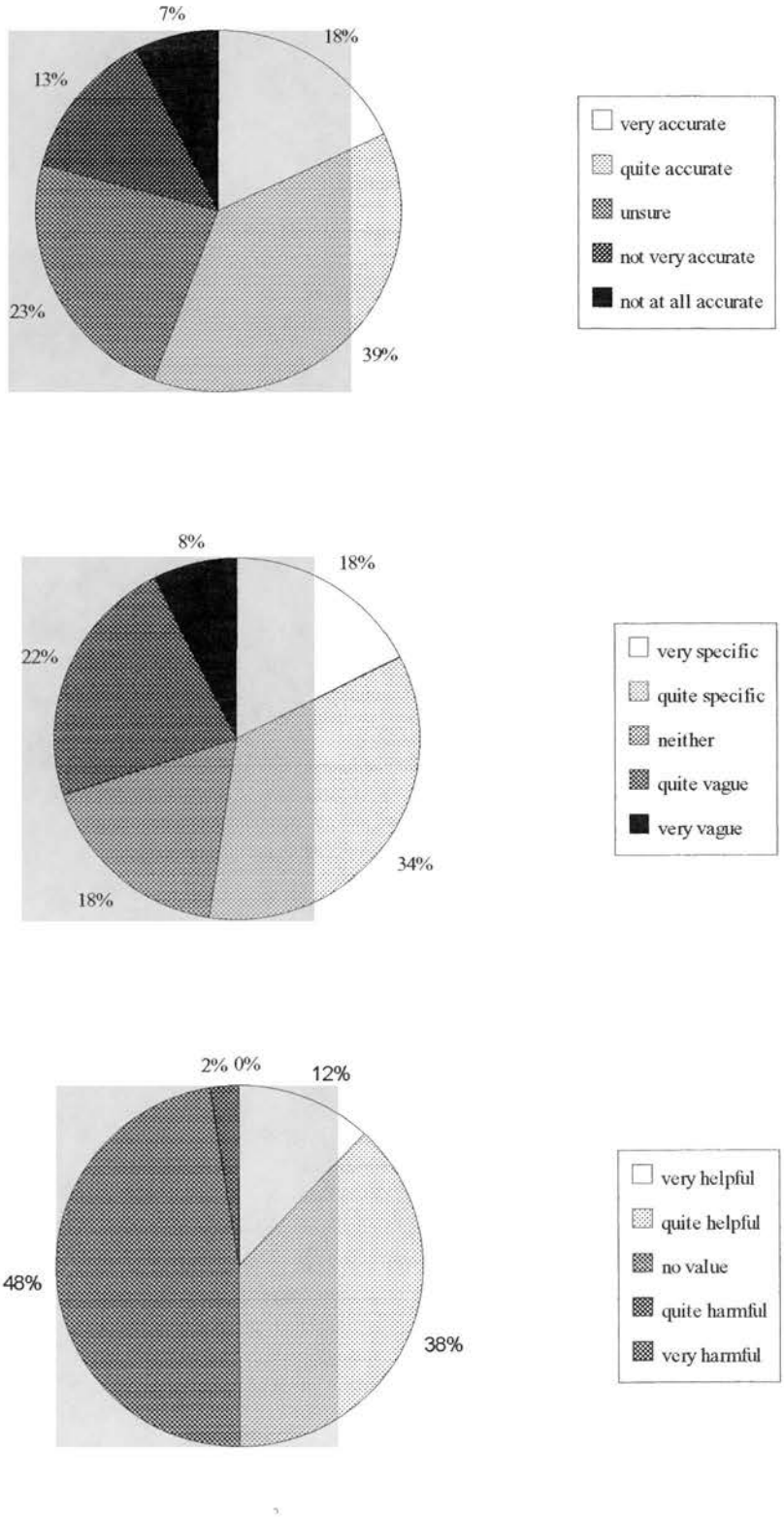


Figure 2.8: Evaluation of the content of psychic readings

Given the tendency for reading material to be accurate and specific, it is perhaps surprising that almost half of respondents (48%) found the reading to be of no value, although 50% did find the experience at least quite helpful. This may simply be suggesting that although the information is accurate, it is trivial (e.g. that I have a print of a racehorse in my living room). There may also be a tendency for accurate statements to be regarded as specific by the recipient (although independent observers may think otherwise). This issue is considered in more detail in subsequent chapters.

Only 2% reported their readings to have been quite harmful and none found it very harmful. This number is too small for us to assess any purported relationship between negative paranormal experiences and level of paranormal belief. For the record, it may be worth noting that the two individuals who found their experience harmful registered belief scores of 11 and 25, where the mean for the subsample of persons who had had at least one reading was 22.11 (std dev: 6.27). This does not provide wholehearted support for the suggestion, noted earlier, that vehement disbelief may be stimulated by strong - but negative - encounters with ostensibly paranormal phenomena.

When combined, the utility ratings compare favourably with those reported by Palmer (1979), where 45% found their readings helpful, and 3% found them harmful. They also fall within the - admittedly broad - range given by Haraldsson (1985), who found that 83% regarded seance-attendance as useful while 28% found

visiting a prophecy-psychic useful. The value attached to readings was also strongly related to its accuracy and specificity [for accuracy x value, $r_s = .97$, $p < .001$; for specificity x value, $r_s = .9382$, $p < .001$]. It may be, however, that information which turns out to be helpful is seen retrospectively as more accurate and specific than it would otherwise. The perplexing other implication of this relationship, namely that vague or non-specific readings are seen as harmful is probably unfounded, since very few respondents regarded the reading as harmful, so that any pattern in these data is swamped by that from those who were impressed by their readings.

2.4.5 Consequences of psychic readings

Figure 2.9 summarises respondents' assessments of how their experience of psychic readings had influenced both their feelings or attitudes about various topics, and their decisions regarding important choices in their lives. In the case of attitude change, it appears that readings only have limited impact, with no more than 12% of respondents regarding any particular attitudes as having changed very much. Attitudes to death and the family are most prone to be influenced, although this may simply reflect the kinds of topics which motivated them to attend in the first place. Least affected are attitudes towards more mundane matters of material wealth and possessions.

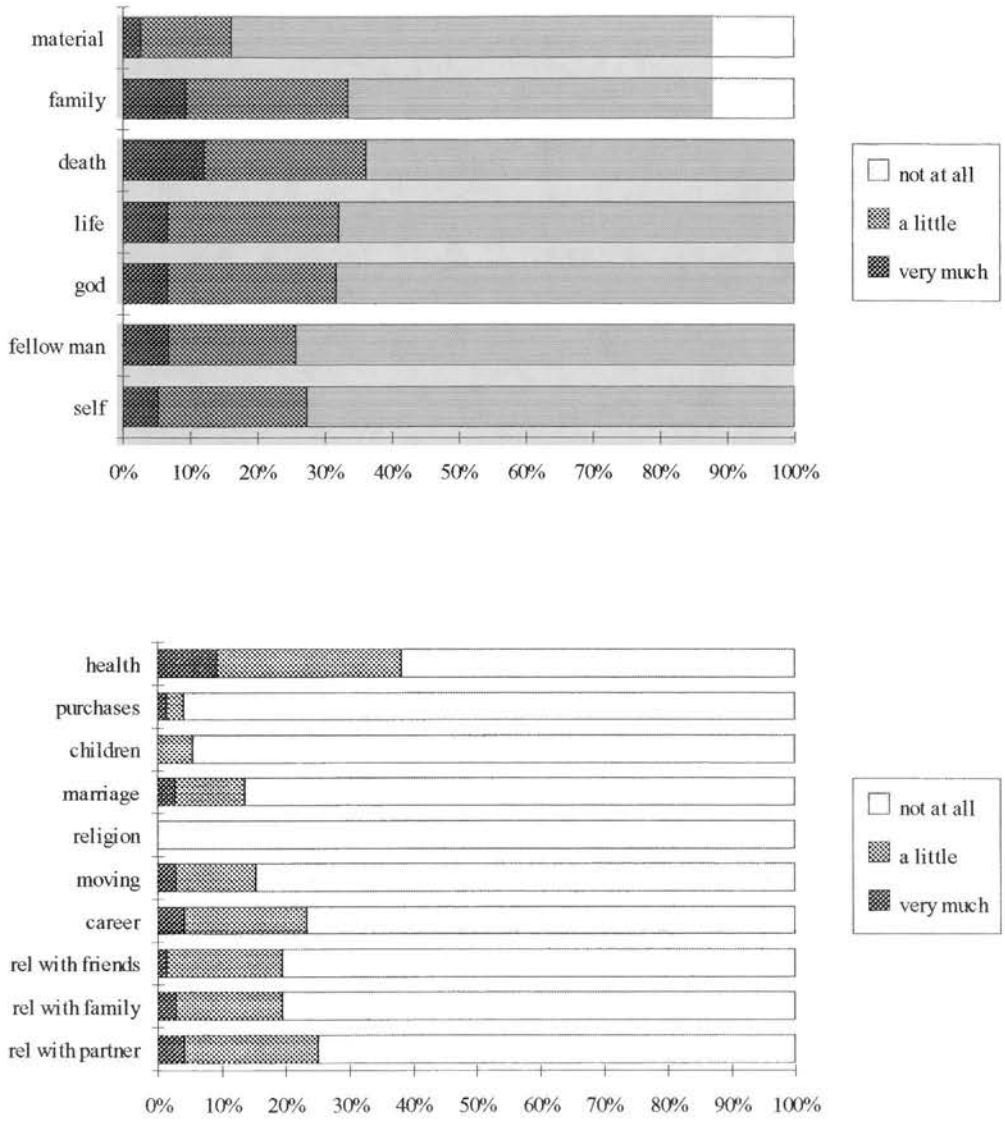


Figure 2.9: Respondents' estimates of the effects psychic readings upon their attutudes and decisions

In terms of effects upon decisions, health choices are most common, along with the client's relationship with their partner and their career. These again may reflect the main reasons for attending the reading initially, although the finding that so many

attend for entertainment or social purposes, would tend to argue against this. Again, more practical aspects of the client's life, such as moving house or making purchases are less susceptible to influence. Interestingly, not a single respondent found decisions they made regarding their religion to be affected by comments made by the reader.

2.4.6 Reading habits

Reading habits were found to be correlated with level of belief in the paranormal [r_s = .48, p <.001], thus replicating the finding of others (e.g. Irwin, 1985; Shiels & Berg, 1977). However, we can further explore the kinds of literature which respondents have in mind when they answer this question. Subjects' responses, which are summarised in Figures 2.10 and 2.11, indicate that almost half (48%) are referring to popular magazines and newspaper features, although a substantial minority (10%) claim the main source of reading to be academic books and journals. This may reflect a rather broad definition of the term 'academic books', but nonetheless implies reading matter of sufficient length to allow phenomena to be discussed in some detail.

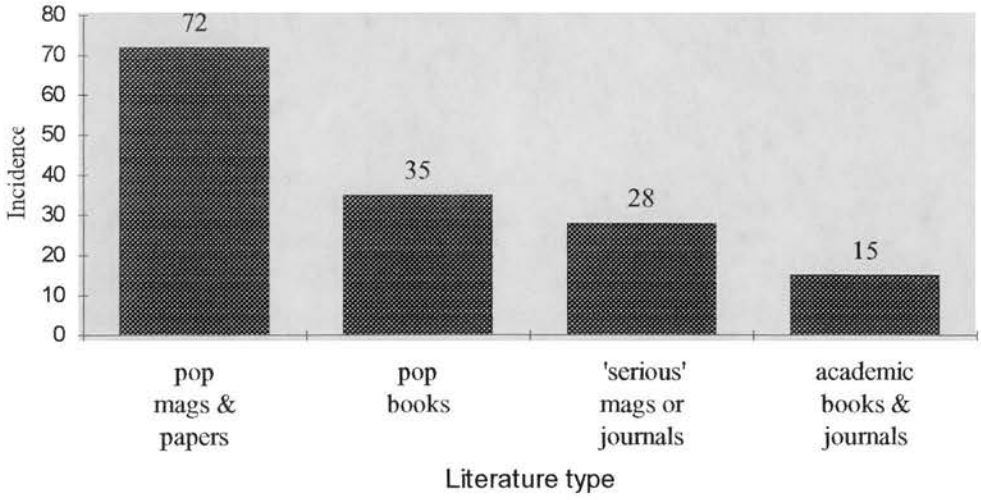


Figure 2.10: Type of parapsychological literature read by respondents

The majority of respondents describe the orientation of their reading material as varying. Forty-two percent describe the literature as at least somewhat accepting - which is the position assumed by the Icelandic scale. Of more interest for present purposes, however, is that 8% describe their reading to be sceptical. This proportion is not sufficient to disguise the relationship between reading habits and paranormal belief, but it may act to diminish its strength, and researchers should be aware of the existence of such sceptical laypersons when making use of the Icelandic scale.

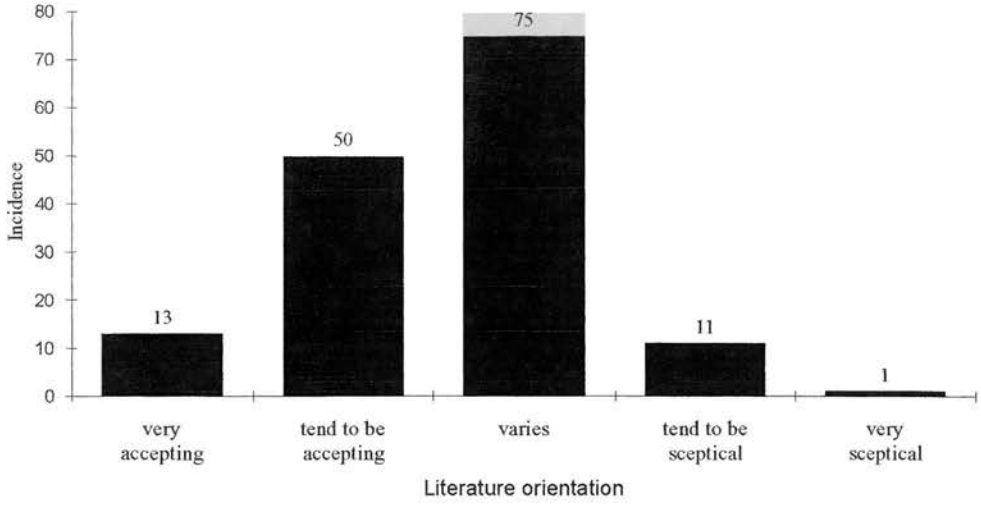


Figure 2.11: Orientation of parapsychological literature read by respondents

Chapter summary

This chapter describes a survey that represented an initial attempt to assess the extent to which reportedly high levels of belief in the paranormal are translated into behavioural consequences for the believer. The focus here was rather narrow, considering primarily interactions with professional readers, but represents a form of encounter with paranormal phenomena which would be widely recogniseable to respondents. The findings suggest that a surprisingly high proportion (29.5%) of the population have attended a reading at some time. Although many of these attended for entertainment purposes, respondents generally viewed their reading as accurate and specific, and 50% regarded the experience as of some value to them. This impression that clients are generally satisfied by the content of their readings is in

keeping with the general consensus among parapsychologists (e.g. Blackmore, 1983; Haraldsson, 1985) and sceptics (e.g. Carlson, 1988; Hyman, 1989).

However, in gauging the effects upon the respondent of ostensible paranormal experiences, this study indicates that they have less impact upon them than has been reported previously (e.g. Palmer, 1979). Although the reading was regarded as quite useful, this did not commonly translate into effects upon attitudes and behaviour. The topics which are most susceptible are typically those which are most likely to be the source of concern which led them to seek a psychic in the first instance, such as health and relationships with significant others (see Martin, 1990), but even here, less than 10% rated the experience or advice as having much impact.

Finally some concern was voiced over the use of the third item of the Icelandic scale, which asks about reading habits, as a measure of paranormal belief. The present study found that we cannot assume that an individual who is well-read in books about the paranormal is necessarily a believer, unless we find out more about the nature of the material being read.

[1] Gertrude Schmeidler (1952, Schmeidler & McConnell, 1958) originally classified ESP Ss as either 'sheep' who believed in the possibility of ESP and 'goats' who rejected that possibility.

[2] Surprisingly, they also report that among their sample just over 50% believed the evidence was strong for anomalous events associated with the Bermuda Triangle.

[3] McClenon's surveys are based on a randomly-selected student sample, so may not be truly representative of the general populations of these countries.

[4] More complex analyses such as covariant structure modelling, exist which do claim to be able to discern some degree of cause-effect relationship, but these are not commonly applied.

[5] An excellent survey of this literature is provided by Irwin (1993), from whom I draw heavily.

[6] A fourth account, in terms of supposed cognitive deficits, does not involve beliefs serving a psychological function as such, so is overlooked here.

[7] Zusne & Jones (1982) argue that the main purpose of any set of attitudes is to fulfil "the understanding or knowledge function, that is, the function that it serves in interpreting, clarifying and making sense of the world. Just like scientific observations and theories, beliefs also serve to create a sense of order, predictability and control" (p. 230).

[8] The Journal of Exceptional Human Experience regularly includes articles in which researchers recount their own personal experiences and describe the impact they have had upon them.

[9] This assertion is (literally) identical to one made by Tyson (1982: 186).

[10] Both items refering to utility were dichotomous allowing only the response 'useful' or 'useless', which may make the finding less impressive since 'useless' would seem to be an extreme response whereas there can be very many shades of 'usefulness'

[11] It is extremely disappointing to note that neither Morris (1981) nor Singer & Bennassi (1980) makes any reference at all to the ethics of subject deception, nor do they record any attempts to gauge (and maintain) subjects' subsequent wellbeing. It is highly unlikely that these studies would pass an ethics committee if conducted as described.

[12] In Schmeidler's (1985) account of this study, the figures for the favourable condition are reported as 56 % sheep, 34 % undecided, and 10 % goats. Percentages given in the text have been calculated from Crandall's (1985) original presentation of results.

[13] Debra Weiner (personal communication, June 4, 1995) has suggested that at the time of publication of the original Icelandic scale, there were relatively few books written by sceptics so that the authors' assumption is reasonable. While accepting that this may temper any criticism of the item's original formulation, it does not affect the highlighted need to update the item to take into account the extensive sceptical literature now available.

[14] At the time of her survey of OBE's (Blackmore, 1984) she claimed that only two previous surveys had used random sampling techniques, and she concluded: "it seems likely that the major cause of ... differences in incidence obtained is the sampling methods used." (p. 226).

[15] The Edinburgh district electoral register lists 346,000 residents, so N was set at 346 to give 1,000 members of the sample.

[16] Footnote from EJP paper re why even stepped scales are preferred, i.e. in terms of avoidance of response set.

[17] In order to be cost effective, the survey also contained items which are relevant to a separate project. This was concerned with assessing the claims made by the social marginality and world view hypotheses apropos concomitants of paranormal belief. Most omissions made in shortening the questionnaire involved these items.

[18] Response rates usually are reported as the percentage of a selected sample from whom data were collected (Fowler, 1993).

[19] A third mailing was planned, but funding was subsequenly not available to allow this.

[20] Note that respondents could check more than one category here, so figures need not add up to 85.

Chapter 3: Methodological considerations in survey design

3.1 Introduction

This chapter outlines the methodological and theoretical concerns associated with survey design which informed the protocol adopted in the study described in Chapter 2. These issues are sufficiently fundamental to justify an extended treatment here, especially given their general neglect in surveys of parapsychological topics. They are presented separately, however, so as not to disrupt the association between the review of the literature on belief in the paranormal and their empirical evaluation given there.

3.2 Population characteristics: the sampling frame

Our first concern is to generate a clear idea of what forms our population (or "universe") about which we hope to learn. The population from which the sample is chosen is known as the sampling frame and represents the limits of the population about which we can validly infer, since all members must have had some opportunity of being selected for us to be able to generalise to them (Sudman, 1976). Although we would ideally aspire to generate a measure of the level of belief of the British or Scottish population as a whole, practical difficulties in adequately sampling such a vast population[1] restricted us to generating estimates of the level of belief in the population of Edinburgh district, for which such lists can be accessed.

Sections of the whole population may be lost from the sampling frame depending on the selection procedures used. By using the Edinburgh District electoral register as the source, all individuals in Edinburgh who are not registered to vote are lost (have no opportunity to be selected), and this in turn restricts the universe about which we can generalise. We may thus overlook individuals who (i) chose not to register (e.g. for political or economic reasons) (ii) are not eligible to vote, by virtue of being under the age of 18, in prison, mentally ill etc., (iii) have moved into the area since the register was taken, and (iv) non-citizens ineligible to vote. The age restriction is not problematic, since we are primarily interested in the attitudes and behaviours of the adult population in any case, although the other limitations may be of more interest. At present all we can do is draw attention to their omission.

3.3 Method of data collection

There are a range of methods of data collection, including the personal interview, the telephone interview, or the drop-off survey. Mail surveys have certain advantages over these: they are of minimal cost both financially[2] and in terms of manpower; non-contacts in the strict sense of respondents not being at home on a particular occasion are avoided; people may be willing to answer embarrassing or personal questions when not face to face with an interviewer who is a complete stranger; we also avoid all sources of interviewer error, such as expectancy effects; and it better allows for 'considered' rather than immediate responses (Moser & Kalton (1971: 258-260). The primary disadvantages associated with the method, however, include:

the need for questions to be sufficiently simple and straightforward to be understood with only the help of printed instructions and definitions; the lack of opportunity to probe beyond the given answer, or to clarify an ambiguous one; the freedom for respondents to regard the questionnaire as a whole, so that items can't be regarded as independent; the method would be inappropriate where spontaneous responses are desired (since there is no constraint on discussing items with others, for example); indeed we can't be sure that the right person answers the questionnaire. The main difficulty with mail surveys compared with other approaches, however, is not usually the issue of getting to the designated respondent, but rather in inducing them to perform the task of filling out the questionnaire without the intervention of an interviewer.

3.4 The problem of non-response

3.4.1 Introduction

Non-response would not be problematic, except in terms of the sheer reduction in numbers, if those who failed to return their questionnaires were similar in all characteristics that matter to those who do provide data. However, Moser (1958) has commented that in his experience "the missing part does often differ materially from the rest and certainly one should never assume that it will not do so." (p. 128).

Blackmore (1985) suggests one source of systematic bias when she warns that "in random sampling from a general population the mean IQ will be around 100 and average education fairly limited; many respondents will have trouble with reading,

writing and the English language; many will be terrified of 'official' looking questionnaires" (p. 6). Others have similarly reported an upward bias in social composition and educational level of respondents over non-respondents (e.g. Palmer, 1979, see Moser & Kalton, 1971, for a review). This is of particular interest where there are grounds for believing that such biases extend to cover or have consequences for the variable of interest (in this case, paranormal beliefs and practices). In this respect, McClenon (1982) found no difference in levels of belief between immediate respondents, those requiring a reminder postcard, and those needing a replacement questionnaire (which may be thought of as an indirect measure of differences between respondents and non-respondents), although Blackmore (1984) did find differences which limited the conclusions she drew.

Steps can be taken to generally encourage returns, however, particularly from the subgroups identified above. Primarily, one should make the respondent's task clear, make the task attractive (including some justification of why it is important that they complete it), ensure confidentiality of responses, and remail non-respondents (Fowler, 1993)[3].

3.4.2 Make the task clear

Fowler (1993) makes the recommendation that the response expected of Ss should be straightforward, for example requiring them to check a box, circle a number, or some other equally simple task. They should not be expected to provide written answers except at their option. Key concepts should be introduced clearly, avoiding

ambiguity, vagueness, and technical expressions. In surveys of parapsychological phenomena, for example, we should remember that terms we take for granted (such as ESP, PK and poltergeist) may be quite unknown to some of the respondents (Blackmore, 1985).

3.4.3 Make the task brief

Blackmore (1985) has suggested that people don't like to complete very long questionnaires because boredom sets in. Cartwright & Ward (1968) did find a lower return for the longer of two questionnaires given to groups of general practitioners, but interpretation here is difficult since any difference in response rate might be due to the nature of the additional questions rather than the extra length itself. Scott (1961a) gave out 3 versions of a questionnaire, 2 short and one long (made up of qustionnaires 1 and 2 combined). Although he found no significant difference in response rates, this may not be surprising, since, as Moser & Kalton (1971: 263) observe, "even the long questionnaire was very short by most standards".

3.4.4 Make the task attractive

An essential aid in making the task attractive to potential respondents is a cover letter. Moser & Kalton (1971) suggest that this takes the place of the interview opening, and as such must try to overcome any prejudice the respondent may have against surveys. In particular, it provides the opportunity to make clear why and by whom the survey is being undertaken, how the addressee has come to be selected for questioning and why he or she should take the trouble to reply. They critically note

that surveyors are "all too ready to expect people to answer their questions without being told what it is hoped to gain from the survey" (p 264).

Besides ethical considerations, a cover letter also provides an opportunity to encourage returns, especially from those who have had none of the experiences covered in the questionnaire, and who may thus be tempted to consider the survey as not relevant to them. One generalisation that seems to hold up for most mail surveys is that people who have a particular interest in the subject matter or the research itself are more likely to return questionnaires than those who are less interested. This means that mail surveys with low response rates may be biassed significantly in ways that are related directly to the purposes of the research (e.g. Donald, 1960; Filion, 1975; Heberlein & Baumgartner, 1978; Jobber, 1984). An oft-cited illustration of this bias is the Literary Digest presidential poll of 1936, which predicted a victory for Alf Landon in an election won by Franklin Roosevelt by a landslide. Although the failure of this mail survey to assess public feeling is in part accounted for by a biased sampling frame (names were selected from telephone books, and Republicans - Landon's own party - were at that time more likely to have telephones), it is also a result of non response. Only a minority of those asked to return questionnaires did so, with those who wanted the underdog to win being more motivated to express their opinion (Bryson, 1976; Converse, 1987). Evidence of bias of this nature can be studied somewhat indirectly by comparing those who respond immediately with those who respond after follow-up steps are taken (Fowler, 1993).

3.4.5 Ensure confidentiality of responses, or guarantee respondents' anonymity.

Fowler (1993) echoes these sentiments, but further recommends an accurate statement of the extent to which answers are protected with respect to confidentiality (which may be especially important where respondents are being asked about beliefs or behaviours which are unusual or controversial); assurance that cooperation is voluntary and that no negative consequences will result to those who decide not to participate; and assurance that respondents can skip any questions that they do not want to answer.

3.4.6 Remail to non-respondents

There are many reasons why an individual may fail to respond to a one-off survey which have little to do with their feelings about the topic under investigation. They may, for example, forget to complete the questionnaire and assume that a deadline for return has passed, or they may lose the questionnaire, or make an error in completing it. To overcome this, Sudman (1976: 15) has recommended at least two follow-up mailings to non-respondents, with a copy of the questionnaire included with each. Moser & Kalton (1971) predict that, as a rough guide,

> something like the same proportion of persons sent questionnaires respond to each mailing; thus, if 60 per cent reply to the first mailing, one might expect around 60 per cent of the 40 per cent of initial non-responders (ie a further 24 per cent of the initial sample) to reply to the first follow-up, and so on" (p. 266).

3.4.7 Minimum returns

Although we noted earlier that mail surveys are particularly prone to low return rates, there is no clear guideline as to when the level of non response negates claims

of representativeness (a quality which is assumed when reporting frequency statistics). Palmer (1979) has claimed that sociologists consider 60% returns to be the minimal rate of return to justify such a claim, a figure which is echoed by Blackmore (1985), whereas Sudman (1976) claims that the generally accepted level of returns for reliability is "about 80%" (p. 30). Such high returns are not unknown in parapsychological surveys (e.g. McClenon, 1982, 1994), but equally are not common. In fact, estimates vary quite considerably as to what constitutes a sufficient return rate for the data generated to be regarded as valid. Moser & Kalton (1971) note that surveys with a response of as low as 10 per cent are not unknown, and that if the sample is of the general population, rather than of a special group, strenuous efforts are usually needed to bring the response rate above about 30 or 40 per cent. Similarly, Haberlein & Baumgarten (1978) suggest that if one simply mails questionnaires to a general population sample without appropriate follow-up procedures, the rate of return is likely to be less than 50%. It is difficult to conclude that the majority of survey work is thus of limited value because its validity is dubious. Certainly, mail surveys in which 5% to 20% of the sample responded are very unlikely to provide any credible statistics about the characteristics of the population as a whole (cf Fowler, 1993), but above this figure it may simply be a case of a gradual increase in confidence in the data as the proportion of the population that are represented in returns increases.

3.5 Sampling method

On theoretical grounds, simple random sampling is the preferred method of population sampling (cf. Moser & Kalton, 1971). In this procedure, members of a population are selected one at a time, independent of one another and without replacement. In practice they are very rare (Sudman, 1976), because unless the list is short or computerised, the process can be very laborious. An alternative which is often preferred because it is easier to use is systematic sampling. This is carried out by determining the number of entries in the sampling frame and the number to be selected (the sample), dividing the latter by the former will give a fraction (1 / n). A start point is designated by choosing a random number between 1 and n, and this provides the first selection. Others are selected by taking every nth subsequent member of the list. Theoretically, this method is not appreciably worse than simple random sampling, since *initially* all members still have an equal likelihood of selection, and in fact the procedure is often described by samplers as 'pseudo-simple random sampling' (Sudman, 1976: 57).

However, once the initial selection is made, selection is periodic, and is thus sensitive to any systematicity in the list itself. Moser & Kalton (1971) provide an extreme example to illustrate the potential effects upon the sample

> Consider a list of married couples, listed in pairs with the husband first. A systematic sample with an even number interval (1 in 2, 1 in 4, etc.) will lead to a sample which comprises either all men or all women. Here, where the sampling interval is a multiple of the periodic interval, the percentage of men in the sample will either be 0 or 100, depending on whether the random number chosen was odd or even. On the other hand, an odd number interval (1 in 3, 1 in 5, etc.) will lead to almost exactly 50 per cent of men and 50 per cent of women in the sample. (p. 84)

It is desirable, then, to select from a list which can be regarded as arranged *more or less at random* or when the feature by which it is arranged is not related to the subject of the survey. When this requirement is satisfied (as, for example, in the listings given in the electoral register), the method of selection is sometimes called 'quasi-random sampling' (Moser & Kalton, 1971, p. 83).

3.6 Stratifying

According to Moser (1958, p. 78), stratification is "a means of using knowledge of the population to increase the representativeness and precision of the sample". It does this in part by minimising sampling error, and stems from the fact that samples will differ from the population from which they were drawn in random ways. This variation can be regarded as composed of two elements: variation between strata and variation within strata. In stratified random sampling, variation between strata does not enter into the standard error at all, because one ensures that this component of variation in the population is accurately reflected in the sample. Almost all samples of populations of geographic areas are stratified by some regional variable so that they will be distributed in the same way as the population as a whole (cf Fowler, 1993). The stratification factor should be a variable which may be influential upon the subject of the survey (for example, socioeconomic status or sex), so that this element can be effectively controlled.

3.7 Sample size

With relatively large (i.e. 500 plus) samples, the added effort of securing further Ss may not be worthwhile in that there is a diminishing return on the effects upon the standard error. In practice, the chief reason for asking for a larger sample is usually a result of needing data for a number of sub-populations, for whom the effects upon standard error would not be negligible. Sudman (1976), for example, argues that a sample should be "large enough so that there are 100 or more units in each category of the major breakdowns and a minimum of 20 to 50 in the minor breakdowns" (p. 30). Current estimates, referred to in the previous chapter, suggest that between 10 and 15% of the population have visited a psychic reader at some time (which constitutes the principal subgroup of this survey). Given this figure, and the estimate that one can only expect returns of approximately 50%, the initial sample size here was set conservatively at 1000.

3.8 Chapter summary

This section has described some of the main considerations that need to be taken into account when utilising a survey protocol. It is suggested that for present purposes, where financial constraints are important, the optimal method consists of a mail survey with a sampling frame restricted to residents of Edinburgh district who are represented on the electoral register. Measures to counter non-response (the primary shortcoming of mail survey research) have been considered, and recommendations made that the survey should be short, free of technical language, with a clear justification of the purposes of the study and an account of how the subject was

selected for participation, along with a guarantee of respondents' anonymity. Finally, it is suggested that there is no clear cut off point below which response rates are too low to be considered representative. Rather, it is suggested that one should apply a sliding scale of confidence in the data generated, with increased confidence as the proportion of respondents increases. In any case, steps can be taken to estimate the impact of non-response upon the conclusions being drawn by considering whether immediate respondents differ along important dimensions from second- or third-mailing respondents (who may be more like non-respondents).

[1] Not least gaining access to a reliable list of members of that universe from which to draw a sample.

[2] But this may not be so if return rates are very low, in which case the cost per return may exceed that of other approaches.

[3] Another method by which one can determine the representativeness of one's sample is to compare the findings with those of others: "If the results replicate those of earlier studies, both the old and new studies gain in credibility, even if the methodologies and questionnaires differ" (Sudman, 1976, p. 27, my italics).

Chapter 4: Cold reading strategies [1]

4.1 Introduction

We have seen in Chapter 2 that a surprisingly high proportion (29.5%) of the sampled population had attended a reading at some time. Although some of these clients had attended only for entertainment or other social reasons, their readings were nevertheless typically regarded as relatively accurate and specific, with 50% of attendees believing the experience to be of some value to them. This picture contrasts quite sharply with research investigating professional psychic readers, which provides little experimental evidence to support the view that they have paranormal access to information about their clients. In the most recent and most extensive review of quantitative studies evaluating material produced during ostensibly psychic readings, Schouten (1994) concluded that "there is little reason to expect mediums more often to make correct statements about matters unknown at the time than ... can be expected by chance" (p. 221)[2].

How can these findings be reconciled? Often, successes by psychics have been explained not as a consequence of psychic ability, but in terms of the exploitation of common (but subtle) channels of communication using what has been termed "cold reading" (e.g. Schwartz, 1978; Randi, 1981). The concept is not new; Whaley (1989) for example describes it as "Originally the argot of psychic mediums by 1924 ... from the fact that the customer walks in 'cold' - previously unknown to the fortune-teller" (p.173), and the stratagem was probably first hinted at in the writings

of Conan Doyle through the instant face-to-face deductions of Sherlock Holmes, published from 1887.

A more recent definition of cold reading, taken from Ray Hyman's classic account of the effect, describes it as "a procedure by which a 'reader' is able to persuade a client whom he has never met before that he knows all about the client's personality and problems" (Hyman, 1977: 20). Unfortunately, this does not give us much insight into the actual process of cold reading, and a perhaps more useful operational definition is given elsewhere by Hyman (1981):

> The cold reading employs the dynamics of the dyadic relationship between psychic and client to develop a sketch that is tailored to the client. The reader employs shrewd observation, nonverbal and verbal feedback from the client, and the client's active cooperation to create a description that the client is sure penetrates to the core of his or her psyche. (p. 428)

In practice, the techniques identified as examples of cold reading can vary in form from case to case; from a simple reliance on using statements which are true of most people (Dutton, 1988) through to a broader definition which includes pre-session information gathering about a client[3] (Hyman, 1977; Couttie, 1988). Techniques such as 'fishing' (to be described later) are regarded as central to some accounts (e.g. Randi, 1981) but as separate, supplementary methods by others (Whaley, 1989). There is a real danger that overliberal and inconsistent application of the term will cause it to lose any explanatory power it has.

There are also clear indications that the cold reading 'process' actually consists of a number of discrete and independent strategies. Hyman (1981) hints at this when he

distinguishes between two 'types' of reading - static and dynamic - which exploit quite different psychological mechanisms. The former makes use of commonalities between clients to allow the reader to launch into a stock spiel which should apply equally well to all, whereas the latter depends upon interaction with the client to generate material which is more tailor-made to his or her specific circumstances. An initial attempt will be made here to identify and characterise the actual techniques brought to bear in cold reading, and to specify their interrelationships. The model which has been developed is informed by two sources:

4.1.1 Pseudopsychic[4] literature

There exists a substantial specialist literature describing the techniques involved in setting up as a pseudopsychic, running under titles such as *Money-making Cold Reading* (Hobrin, 1990) and *Cashing in on the Psychic* (Ruthchild, 1978). This literature is typically produced to allow the peudopsychic fraternity to share resources and expertise, and is not intended to be generally available. Books are privately published or produced by specialist publishers of magic literature, and tend to be advertised in private circulation magic society catalogues and magazines. Access to these suppliers was made possible with the assistance of Professor Robert Morris and Dr Richard Wiseman. The latter is a proficent close-up magician and member of a number of magic societies, who was at that time a member of the parapsychology unit at Edinburgh. Together, we have been able to build a reasonable pseudopsychic library from which to develop a description of cold reading practices as articulated by pseudopsychics themselves (Cain, 1991; Corinda, 1984; Earle,

1990a, 1990b; Fuller, 1975, 1980; Hester & Hudson, 1977; Hobrin, 1990; Jones, 1989; Lewis, 1991; Martin, 1990; Ruthchild, 1978, 1981; Webster, 1990).

4.1.2 Interactions with a practicing pseudopsychic

An exploratory study, conducted in cooperation with pseudopsychic Malcolm Davidson, allowed us to investigate the mechanics of cold reading *in situ*. Davidson contacted the parapsychology unit in response to an article written by Richard Wiseman on pseudopsychic deception. He had worked as a psychic reader in the Yorkshire region for over 15 years, but was at that time semi-retired and was happy to share some of his expertise with us. A one-day initial exploratory study was arranged in which Davidson was filmed giving separate readings to three individuals in the morning, and gave a commentary on the techniques being used in the afternoon.

Three sitters (all female) were selected by myself and Wiseman to represent a broad age range[5], and were invited to participate in 'a preliminary evaluation of a psychic reader'. Sittings took place in the University's television studio, and were filmed using three video cameras. The first of these gave a side-on long shot (full body) of the sitter and reader. Cameras two and three gave mid-shots (waist up) of the sitter[6] and reader respectively. Recordings from cameras two and three were edited together to give a vertical split-screen view of the interaction, with one half showing the reader and the other the sitter.

Upon completion of the reading, each sitter gave immediate feedback, ostensibly to allow us to decide whether further testing would be fruitful. Ss gave three ratings, indicating how impressed they were with the reading's content, how relevant it was to worries or concerns they had, and how psychic they thought the reader was. Responses were given using a 7-point Likert scale, where 1 = not at all, and 7 = very much. Sitters' actual ratings are reproduced in Table 4.1:

sitter	impressed	relevance	psychic?
One	6	5	5
Two	6	6	7
Three	1	1	1

Table 4.1: Sitters' ratings of their reading

Two of the readings were very well received, suggesting that the pseudopsychic techniques being used were successful in persuading these clients that the reader did have paranormal access to information about them. Subject three was an academic colleague who worked in the department. It seems likely that she did not conform to the stereotypes Davidson usually uses with women of her age. She is also most likely of the three to be generally sceptical of claims of psychic ability. Immediately after supplying ratings, sitters were debriefed as to the true objective of the investigation.

In the afternoon, we met with Davidson to review the video recordings. Davidson was video taped giving a commentary on the three readings, and answering questions about the actual methods used. Copies of all video material are lodged with the Koestler Chair, and are available for inspection. Video footage was studied to

compare theoretical accounts of cold reading as given in the literature with actual examples of the process in practice. We had intended to conduct further work with Davidson, but sadly he died before this could be arranged.

4.2 An expanded model of cold reading

The above sources of information about the pseudopsychic technique suggest a model in which cold reading actually encompasses a number of discrete operations which appear to represent a hierarchy (see Figure 4.1).

All these processes involve the gathering of intelligence about the client, but are distinguishable on the basis of when and how transfer of information occurs, and of what form that information takes. Those at the base of the hierarchy require little, if any, interaction with the client, but the reading so-produced remains relatively vague or general. As the opportunity for interaction increases, so the reading can be made more specific to the client in attendance. Knowledge of all of the processes enables the reader to produce a reasonable sketch whatever situation he finds himself in, while being able to be increasingly impressive when circumstances allow.

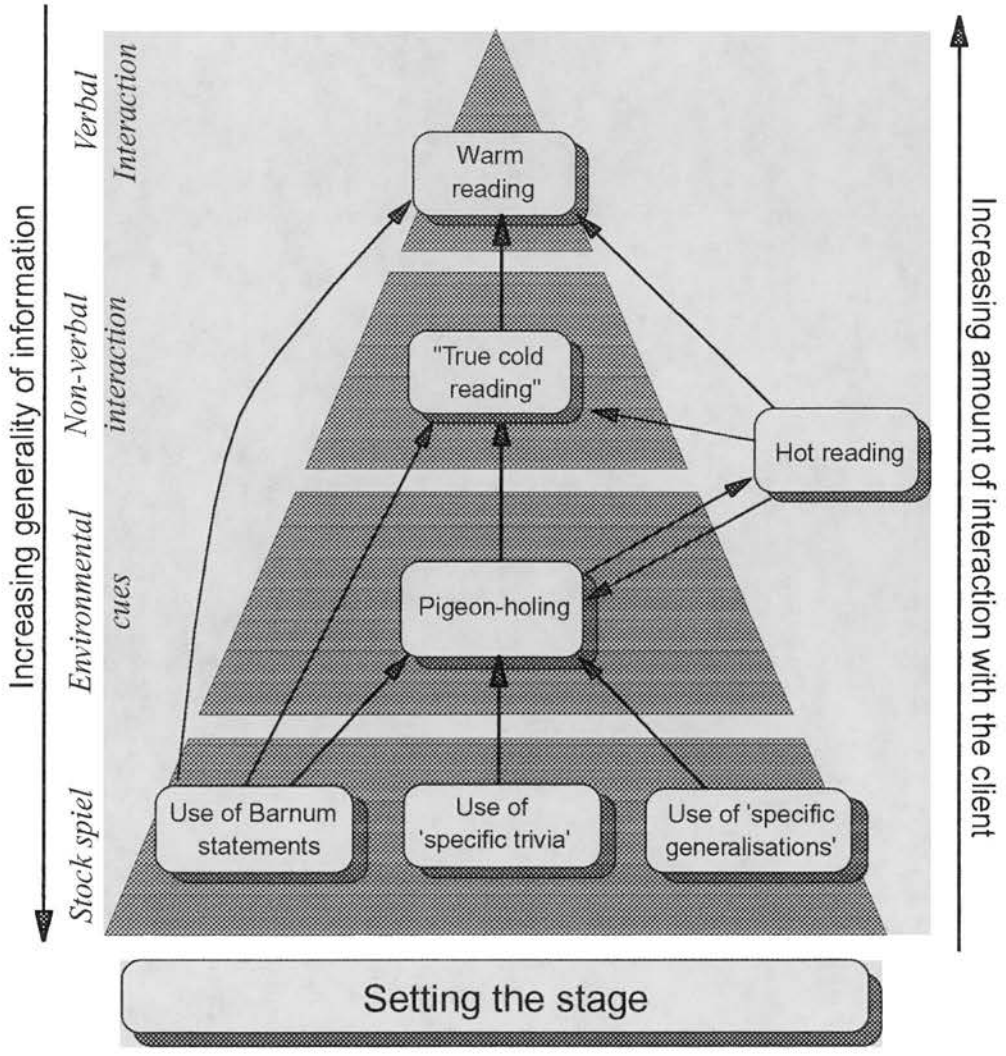


Figure 1: Hierarchy of strategies commonly labelled as 'cold reading'

Strategies which appear higher in the pyramid are somewhat dependent upon the use of those lower down for success. For example, the use of information drawn by virtue of pigeon-holing the client may be needed to initiate the necessary conditions for cold reading by providing the source material for the client to react to. Similarly, Barnum statements may be used as distractor items before feeding back information unwittingly given up by the client in warm reading. However, it should be noted that although these strategies can have a particular temporal order, in that some stages tend to be passed through to generate information necessary for stages higher in the pyramid, the reading *as a whole* does not represent a steady progression through the hierarchy. Rather, the reading is more likely to involve a number of switches from technique to technique depending on the information that is available. For example, if the initial conditions are such that the client immediately offers up personal information, the reader may decide not to employ lower-order methods of generating material for the reading. The remainder of this chapter provides an overview of the strategies which together seem to make up cold reading.

4.3 Setting the stage

An important aspect of the persuasion process is to set the stage for the reading; this includes careful consideration of how the reader advertises himself, how he presents himself, and how he manages the initial interactions. Its purpose is threefold: to persuade the client that the reader is genuine, to engage the active participation of the client in the reading process, and to provide plausible 'outs' should the reading nevertheless not be a success.

With regard to presentation, the reader should appear professional and in control of the situation. Earle (1990b), for example, urges magicians interested in specialising in pseudopsychic effects to dress smartly, and warns that "You will save about 80-90% of what you were spending on props, but you'll end up spending it on wardrobe". Dean et al. (1992) have described how graphologists can use polished presentation to triumph over lack of substance. They label this the *Dr Fox Effect*, after the first experimental demonstration of it in which a Dr Fox gave a well-received one hour talk on games theory to 55 psychiatrists and social workers (Naftulin et al., 1973). In fact Dr Fox was an actor, although

> He looked distinguished, sounded authoritative, and lectured charismatically with much jargon, enthusiasm, jokes, and references to unrelated topics. His talk was highly entertaining but deliberately meaningless. Yet the audience found it to be clear and stimulating, and nobody realized it was nonsense. (Dean et al., 1992, p. 371).

Appearance may also be effective in inducing a Halo effect (Cooper, 1981; Kelly & Renihan, 1984). Here it is argued that if the reader possesses some positive characteristics (such as dressing well, appearing warm and friendly) we will readily attribute other characteristics (e.g. that he is sincere, genuine, trustworthy) to him.

The reader works hard, both in terms of presentation and through verbal exchanges, to establish that they are in control of the situation; they emphasise that they have a track record of successful demonstrations so their expertise is not in question - any 'failures' must inevitably be placed firmly at the feet of the client. Thus it is already agreed that much of the burden for making the session a success falls on the client:

> If something that the reader later says does not tally with the client's beliefs or does not make sense, the client has been prepared to treat the apparent confusion as due to the client's own failure to understand adequately rather than to the psychic's lack of knowledge. (Hyman 1981: p. 430).

The reader also emphasises the co-operative nature of the reading. Messages may come through them which are only meaningful to the client and which cannot be deciphered without their help. Earle (1990a), for example, notes

> The best readers always include a statement like, 'I only see pieces, as in a jigsaw puzzle. It is up to you to put them together', or, 'I may speak of a person being crushed by a house as in The wizard of Oz, but you recognize it as a friend with overdue mortgage payments'. This attitude has the additional advantage of enlisting the active participation of the client. She is always searching for meanings to your statements and, when she makes the connections, will vividly remember them later. The better her mental images the longer she will recall, and try to validate, your statements. (p. 6)

The client's active co-operation can be further encouraged by establishing a rapport with them. Hobrin (1990) stresses that the primary attribute in a reader is to have a pleasing, charming, *disarming* personality. Martin (1990) further suggests that by involving the client physically in whatever divination process is being used (such as shuffling the Tarot cards or casting the I Ching) they become *participants* rather than just observers.

Although the reader has asserted his expertise, he can use the process of setting the stage to also prepare an 'out' should the client not be able to understand elements of the reading, despite much effort. It should be stressed that this need not imply that the reader's psychic gift is fallible in some way (which would be contrary to the primary message conveyed during stage setting, outlined above). Rather, it can be understood as suggesting that the psychic ability is somewhat independent of the

percipient him or herself; whereas the gift is infallible, the percipient and client are prone to misunderstand its 'true' meaning. Lewis (1991), for example, recommends saying of the reading

- This is like looking through frosted glass; I don't see everything, I only see little glimpses.
- Clairvoyance is not something you can just turn on and off like a tap, sometimes it comes and sometimes it doesn't.
- This is not the ten commandments. I don't know everything - if I knew everything I could win the pools.

Perhaps best of all, he draws a parallel with weather forecasting; just as weather forecasters get it badly wrong on occasion without our rejecting their predictive methods, so even gross errors of prediction here won't invalidate the method from which they were derived (i.e. the reader's claim to be psychic). Once the client has been sufficiently primed to work hard to understand the meaning of the reading, the pseudopsychic can move on to generate material for them.

4.4. The stock spiel

A stock spiel reading, also known as a psychological reading (e.g. Hyman, 1981) is made up of prepared phrases, and can be delivered not only without feedback from the client *during* the reading, but also without the reader having any contact with her[7] *before the session begins*. Such statements allow one to give a general description of the client, perhaps including some personal details but without focussing on any specific problems. They are of particular use with "sensation-seekers" who really have only come for a reading out of curiosity or for entertainment, or in situations where the lack of contact will make the reading seem

impressive, for example if giving a reading over long distances or while screened from the client. The items which make up a stock spiel can be assigned to one of three broad categories of statements; specific generalisations, specific trivia, and Barnum-type statements.

4.4.1 Specific generalisations

Couttie (1988) coined the term "specific generalisations" to describe items that ostensibly are very specific, but still are meaningful to most people. These items exploit the maxim that we are essentially more alike than different (see Figure 4.2), but that we are generally not aware of our similarity (see Snyder & Fromkin, 1980). Jones (1989) effectively characterises specific generalisations when he states

> Each of us likes to think of ourselves as unique, with problems and needs and goals that sets us apart from all the others. We're not. Although we may mistrust generalities, whether we like it or not, there is a commonality about our fears, wants, and aspirations that make them predictable ... Psychic readers recognise this, and use it to their advantage. (p. 10).

Couttie (1988) even recommends that the reader give the client a general run-down on the reader's own life-story, hopes and fears, angled as though it was the client's, in order to illustrate just how impressively accurate this can be. Also included here is the traditional "cradle-to-the-grave" reading, which extends the principle of similarity to suggest that most of us go through the same stages in life, and at roughly the same ages. It has even been suggested (e.g. Ruthchild, 1981) that psychics make use of life-span development books for stimulus material. A popular lay account of life-span development by Gail Sheehy (Sheehy, 1976) is a common recommendation (e.g. Martin, 1990).

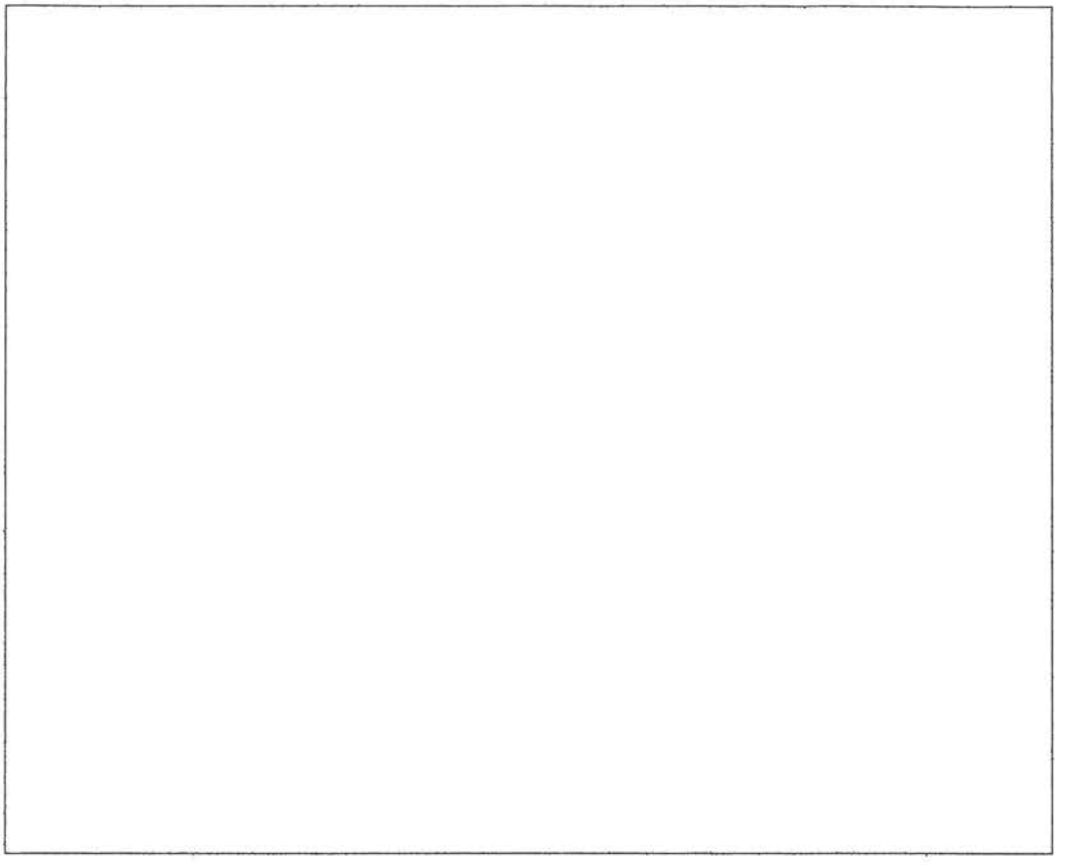


Figure 4.2: Snyder & Fromkin's (1980) caricature of the need for uniqueness

As well as going through similar life events to one another, we can also relate to specific but relatively common events. Typical examples include; the death of an older male with a heart condition, the death of a very young (or unborn) child, a divorce affecting someone the client knows well, and so on. In a similar vein, Couttie (1988) suggests trying

> not-too-rare names like Ann, Mary, Joan, John, Arthur, Joseph (remembering that the further North you go the more traditional the names are likely to be) ... keep away from Smith, but you could try Williams, Willcox, Robinson or Clark. (p. 137).

And the sources of this general knowledge can be quite surprising:

> I find that psychology and statistics provide a lot of these good general lines. Collect items from *Psychology Today*, *Readers Digest*, or a newspaper, statistics like '83% of American women over the age of 21 say that they ...' (Martin, 1990: 98)

Associating the generality with something that is unique to the client (such as the lines of the palm, or the particular arrangement of cards) serves to draw attention away from its general applicability.

4.4.2 Specific trivia

Other statements, labelled here as "specific trivia" (although Webster [1990] refers to them as 'platitudes'), are so trivial that they only become memorable if they come true, and even then are impressive *by virtue of being true* rather than because of what they can say about the client. For example, Davidson often used the prediction that the client would see something in a shop which they would have an urge to impulse-buy, safe in the knowledge that if no such event occurs then the prediction will be forgotten. Martin (1990) suggests peppering the reading with examples of what he terms 'out of the blue' items which touch on; a minor car problem, or some appliance breaking down; strained relationships with someone close; a recent minor hitch in finances; a relative who is wearing blue; a driver of a green car; and a recent sleepless night.

4.4.3 Barnum-type statements

Barnum statements are general personality descriptions which apply to almost everyone, under most circumstances (see e.g. Tyson, 1982; Furnham and Schofield, 1987). Acceptance of such statements is referred to as the Barnum effect. Dickson & Kelly (1985: 367) have defined the effect as the tendency for "people to accept general personality interpretations as accurate descriptions of their own unique personalities".

It is claimed that the descriptions are readily accepted because they are sufficiently vague as to allow the subject to read into them what they want. Indeed, the Barnum effect is so-called in reference to the American showman P.T. Barnum who is alleged to have attributed the popularity of his circus to their being "a little something for everybody" (cf. Meehl, 1956, see also section 7.1.1 for an alternative interpretatation). For example, Martin (1990) offers the Barnum line "You've come a long way psychologically from where you were even a few years ago" (p. 22), which could relate to any change the client has experienced.

Specific generalisations and specific trivia can be distinguished from Barnum statements in that they differ in the degree of apparent specificity of the descriptions being given; the former rely primarily on base rates for their success whereas the latter tends to rely more on inherent vagueness to encourage the client to read meaning into them[8].

The phrases recommended by pseudopsychics vary little from those used in the psychological literature to investigate the Barnum Effect (see, e.g., Hester and Hudson, 1977), and indeed Earle (1990) actually recommends Forer's (1949) original 13 Barnum statements (reproduced as Figure 4.3) as crib material. It has been consistently found in experimental studies that subjects are willing to accept such statements as being uniquely true of them (see Furnham & Schofield, 1987), and appear unaware of the likelihood that they could apply equally well to others (e.g. Ziv & Nevenhaus, 1972).

Where the phrases used by pseudopsychics do differ from Forer's thirteen, they still tend to share characteristics which have been isolated by Sundberg (1955) as being influential upon acceptance or rejection, namely the use of (i) vague statements such as items 3 and 7, (ii) 'double-headed statements' (which make two opposite and complementary predictions) such as items 6 and 11, and (iii) favourable statements such as 4 and 9.

It has been argued (e.g. Layne and Ally, 1980; Tyson, 1982) that such sketches are effective because they allow the client to read into them what they want. Two mechanisms in particular are thought to be at work. Firstly that Ss will tend to remember only the correct statements. Hyman (1981), for example, notes of selective recall

> Both lab research and what we know about actual psychic readings predict that the client will remember mainly those things the psychic said that were consistent with the overall script. (p. 433; a similar view is espoused by Hester & Hudson, 1977, p. 6).

1. *You have a great need for people to like and admire you.*
2. *You have a tendency to be critical of yourself.*
3. *You have a great deal of unused capacity which you have not turned to your advantage.*
4. *While you have some personality weaknesses, you are generally able to compensate for them.*
5. *Your sexual adjustment has caused some problems for you.*
6. *Disciplined and self-controlled outside, you tend to be worrisome and insecure inside.*
7. *At times you have serious doubts as to whether you have made the right decision or done the right thing.*
8. *You prefer a certain amount of change and variety, and become dissatisfied when hemmed in by restrictions and limitations.*
9. *You pride yourself as an independent thinker, and don't accept others' statements without satisfactory proof.*
10. *You have found it unwise to be too frank in revealing yourself to others.*
11. *At times you are extraverted, affable, sociable, while at other times you are introverted, wary, reserved.*
12. *Some of your aspirations tend to be pretty unrealistic.*
13. *Security is one of your major goals in life.*

Figure 4.3: Forer's original 'Barnum Statements'

And Dutton (1988) has claimed

> Even where there are negative or undesirable elements in a Barnum description, subjects have ... a strong tendency to notice and remember only a percentage of available items. This is selectivity of attention ... confirmations are remembered, often quite vividly, whereas less plausible aspects of the description are paid correspondingly less attention. (pp. 327-8).

Secondly, subjects will impose their own meaningful interpretation on the statements, embellishing them with their own specific detailed experiences that will make the generalisations seem more accurate than they really were (e.g. Hyman, 1977; Corinda, 1984). This can be accounted for in terms of schema theory, which suggests that subjects are likely to unconsciously impose a particular structure on the communication which will invest it with a particular, relevant (to the percipient) meaning. The classic account of this phenomenon has been given by Bartlett (1932), who found that his subjects misrecalled a Native American folk tale called 'The War of the Ghosts' in ways that were determined by their prevailing schema. For example, elements of the story that did not accord with expectation were omitted, and other material was distorted so as to make it fit better with subjects' Cambridge backgrounds (see also Bransford & Johnson, 1972; Pichert & Anderson, 1977). This process can be readily illustrated here via an example suggested by Marks & Kamman (1980, adopting a task originally used by Dooling & Lachman, 1971).

In reading the following text, try to ignore the fact that the poem is about Christopher Columbus.

With hocked gems financing him
Our hero bravely defied all scornful laughter
That tried to prevent his scheme
Your eyes deceive he said
An egg not a table correctly typifies
This unexplored domain.
Now three sturdy sisters sought proof
Forging along sometimes through calm vastness
Yet more often over turbulent peaks and valleys
Days became weeks
As many doubters spread fearful rumours
About the edge
At last from nowhere winged creatures appeared
Signifying momentous success.

Figure 4.4: "The voyage of Christopher Columbus"

The belief that the text is about Columbus directs our understanding of each part of the message, conjuring up particular images or interpretations for elements of the text in an effort to maintain the sense. Thus the reference to 'three sisters' is understood not to be taken literally, but to refer to the ships Columbus' party sailed in. It could be argued that similar processes are at work in the case of a pseudopsychic reading. Here the overarching schema is that what is said is intended to concern the client and should be interpreted with reference to events and

circumstances surrounding them. Marks & Kamman (1980) describe this 'effort after matches' in terms of

> The micro-machinery of subjective validation. The rule is simply - keep searching for similarities until an overall match has been made (cherchez la correspondance). Once the match is presented it will be hard to see how it could be any other way. (p. 182).

Randi (1981) gives a nice example of reading more into a reading than was actually said. As a guest with Paul Kurtz on a Canadian TV show he witnessed the psychic Geraldine Smith working the vibrations from an object belonging to the host. She gave the rather vague prediction "I'm seeing the month of January here - which is now - but there would have to be something strong with the person with January as well." (p. 107). Although sceptical of the reading as a whole, the host of the show noted on reflection that Smith had actually determined that his birthday was in January. In fact no mention had been made of what type of association with January was being referred to - the client was left to fill in the gaps. In a similar vein, Schwartz (1978) describes a performance by Peter Hurkos in which the efforts made by the client to make sense of a statement are quite explicit:

Hurkos:	*One two three four five - I see five in the family.*
Caller:	*That's right. There are four of us and Uncle Raymond, who often stays with us.*

Dean et al. (1992) describe this tendency as the Procrustean effect, after the Greek mythical figure who would stretch his guests' limbs or sever them in order for them to fit his bed. Communications are similarly stretched or truncated to fit the client's

circumstances. Schwartz (1978: 53) has argued that even talking complete nonsense need not be a bar to success :

Hurkos:	*When you want to break the marriage that time he did not have a chance. When you said 'If I don't, if I don't want him and I lose him - I like him, I am not listening to anybody - I want a want a want, or get the house! This is correct?*
Woman:	*That is fantastic!*

Clients may even alter their perception of events to have them fit with the reader's predictions

> For example, if a girl is told that her life will be influenced by an imaginative, sensitive man, she may start attributing artistic qualities to the basketball player she has been dating, even though she never previously thought of him as being a particularly imaginative or sensitive person. (Hester & Hudson, 1977, p. 6)

Delaney & Woodyard (1974) offer a nice experimental illustration of a situation in which subjects are motivated to actually alter their own self perception in the light of predictions made. In their study, Ss were given a personality sketch ostensibly based on their star sign but in fact descriptors were randomly allocated. Ss were also given a short questionnaire asking about their actual personality to be compared with the astrological predictions. Ss responses on this measure suggested that their self-description was influenced by the astrological sketch.

4.5 Pigeon-holing

Stock spiel statements are necessarily general, even though interpretation by the client is claimed to make them seem more impressive. To provide more specific assertions, the reader must narrow down the number of topic areas which could

possibly be relevant. To do this he assigns the client to a particular category, generating a stereotype for that sub-population which will inform him of the kinds of interest or concern to concentrate on. Such classification seems to occur along two main dimensions which are somewhat mutually dependent: what type of person the client is, and what type of problem they are concerned with. Pigeon-holing makes use of information leakage which occurs very early in the reading situation and requires little, if any, subsequent feedback. Instances in which this situation occurs include some types of radio reading, where psychics are invited to give readings on the air for listeners who telephone the station, and more recently with advertised telephone readings. Here there is an initial (verbal) contact with the client which can provide details about sex, age, and perhaps some regional and socio-economic information, but then involves what the client may perceive to be impressively little subsequent interaction.

4.5.1 The client

The reader classifies the client prior to or very early in the reading, by scanning the environment for sources of intelligence about her. Davidson has stated that initial impressions of the client, as she enters the room, exchanges greetings, and seats herself, are particularly important. This is because the client is off her guard at this point, unaware that the 'reading' has begun, and so is prone to leak more information about herself than she would during the actual reading. Indeed, if Davidson found himself unable to allocate a client to a relatively narrow pigeon hole category by the time she sat down, it was unlikely that the reading would be a success.

The main distinctions are made according to the sex and age of the client, and at one extreme may simply use a narrowed version of the cradle-to-grave reading, or other stock spiel, determined by information given up by the sitter. For example, Couttie (1988) describes how:

> Up to the age of twenty or twenty-five the main concerns are sex and relationships of different sorts. From then to the mid-thirties the concerns are mainly about jobs, money and the home. For the next ten years there is a shift towards worries about children's futures, parental health, rethinking careers and so on. From about forty-five onwards there are worries about personal health, one's own marriage, a desperation about the direction of one's life, concern about grandchildren and so forth. (p. 137).

Webster (1990) similarly describes different scenarios depending on the age of the client. For younger sitters, he portrays a very positive, optimistic future (but still within the realms of possibility). From the age of 30-35, however, clients "start to realise that the dreams they had will never eventuate". So for an older person he offers the more realistic "Money hasn't always been easy. You've had to work pretty hard to get where you have." and he predicts more moderate achievements gained through effort rather than good fortune. For much older sitters, the real concern is with loneliness as much as it is with poverty, so it is always worthwhile to describe how they won't be alone in their old age (see, e.g., Martin, 1990, p. 36).

Further information can be gleaned from the client's clothing, physical features, carriage and manner of speech which can point more specifically to their past history and future aspirations. Hyman (1977) provides an illustration of the process in action, recounting a story told by the magician John Mulholland which occurred in the 1930s (and which may now appear to be somewhat dated):

> A young lady in her late twenties or early thirties visited a character reader. She was wearing expensive jewelry, a wedding band, and a black dress of cheap material. The observant reader noted that she was wearing shoes that were currently being advertised for people with foot trouble... By means of just these observations the reader proceeded to amaze his client with his insights. He assumed that this client came to see him as did most of his female customers, because of a love or financial problem. The black dress and the wedding band led him to reason that her husband had died recently. The expensive jewelry suggested she had been financially comfortable during marriage, but the cheap dress indicated that her husband's death had left her penniless. The therapeutic shoes signified that she was working to support herself since her husband's death. The reader's shrewdness led him to the following conclusion - which turned out to be correct: The lady had met a man who had proposed to her. She wanted to marry the man to end her economic hardship. But she felt guilty about marrying so soon after her husband's death. The reader told her what she had come to hear - that it was all right to marry without further delay. (p. 408)

In the exploratory study, Davidson noticed that one of his clients heaved a sigh as she sat down. He correctly surmised that she spent much of her working time on her feet. She was very particular about her appearance, so he believed that she was used to being in the public eye. On the assumption that she worked in a shop or public house, he fed her a line about her being very open and friendly and would be well suited to working in a profession where she would be in contact with the public - if she didn't already. It transpired that she did indeed work in the service industry

If the reading is held in the client's home, then themes found in collections of ornaments, pictures, or books will also indicate some hobbies, interests, and aspirations. These will help the reader to assign the client to a narrower and presumably more accurate category. When taken to an extreme, the classification can be quite specific, for example by exploiting the discovery of hobby stickers on cars which indicate membership of particular clubs or societies, or necklaces bearing initials (Hester and Hudson, 1977). The reader should not necessarily ignore very obvious sources of intelligence. As Hobrin (1990) notes, "You may be surprised to

learn the number of people who forget that they are wearing their birth sign or name around their neck. They say familiarity breeds contempt; I'd say that it breeds forgetfulness ... never overlook the obvious" (p. 12).

At times, this process can be barely distinguishable from "hot reading", which involves gathering intelligence about the client in advance of the reading (and which will be described in more detail later in this chapter). However, hot reading can be distinguished from the other stratagems discussed here on the grounds that it is possible for a shut-eye to unwittingly be exploiting processes such as pigeon holing, whereas with hot reading the information gathering is much more contrived and vigorous (see, e.g., Fuller, 1975, 1980). The former may also be considered more 'fair' to the client, since it only makes use of sources of information which are equally available to them during the reading (and which thus can allow them to better evaluate the paranormality of the communiation).

Strictly speaking, however, hot reading should not be included under the banner of cold reading, as on occasion it has been (e.g. Hyman, 1977; Randi, 1981), since it does not entail the reader coming into the reading situation "cold" (i.e. knowing nothing about the client in advance). However, when used, the information gained in this way is not baldly given up but is interwoven with information derived from the other strategies to give a broader reading, and so arguably should be included in any model dealing with the interaction of different cold reading strategies.

As well as providing an overarching category within which to set the client, simple observation can also provide the reader with titbits which can appear to be remarkably insightful. Selected examples (drawn from Martin, 1990) are given in figure 4.5 to give a flavour of the kind of information which can be gleaned.

- Ridges in a belt may indicate fluctuations in weight.
- A worn left heel (reversed in Britain) indicates a lot of time driving, perhaps with work.
- Tall women tend to dislike their feet (as too big) especially when they were younger.
- A mole or birthmark on the neck or shoulder is usually accompanied by one on the back, usually lower back.
- Men (in particular) who wear their watch on the right wrist tend to be left-handed. This can be alluded to by predicting: "When you were a child, adults around you tried to make you change your ways, but you chose a path not as populated as most. All your life, I see you marching to the beat of a different drummer".
- Women who sigh a lot and look somewhat depressed, tend to strongly agree with a description in terms of a 'tough life, hard uphill struggle' no matter what their financial or social position.

Figure 4.5: Simple observations providing insight into the client's circumstances

4.5.2 The problem

By pigeon-holing the client, and padding out the reading with general statements drawn from the categories described previously, the reader is in a position to tell her some quite impressive facts about her personality and life history. However, as Jones (1989) notes, "A perception of accuracy is not sufficient to make a reading satisfactory in the minds of most clients" (p. 22). The primary function of a reader in most instances is to act as a counsellor (Richards, 1990; Lester, 1982). Clients come to him with a problem for which they seek comfort and advice. Even

"sensation-seeking" clients will identify a specific problem or question which is uppermost in their minds and wait to see what the reader has to say about it. As with the cradle-to-grave technique, strategies developed to determine the client's problem rely on the assumption that we are more alike than different. The problems which occur in life belong to a finite (and small) number of categories, each of which has only a limited number of specific problems associated with it. The number of categories commonly used varies from psychic to psychic (see Table 4.2), although some of the items may represent sub-divisions of larger categories. Jones' (1989) grouping of human problems under six categories has been chosen in part to give the particularly apt acronym THE SCAM when the letters are rearranged.

Earle (1990) Hyman (1977)	**Jones (1989)**	**Ruthchild (1981)**	**Hobrin (1990)**
love	sex	sex love children	love life marriage children
money	ambition career money	social standing ambitions / goals financial security	social life & recreation work & professional prospects financial prospects
health	health expectation	health immortality	health & possible long life
_____	(travel)	(psychic potential)	(character assessment)

Table 4.2: Commonly used problem area categories

Utilising the population stereotypes noted above allows the reader to assess the probabilities of each problem area being applicable in this case. By ranking them in this way he can quickly deal with each of the most likely worries. By mentioning all of the possible problem categories, he can be sure to have covered the one most

relevant, even if only in the most general of terms (Corinda, 1984). This will make the reading seem successful to the client because, according to Jones (1989), she "will assign immediate significance to any mention ... of her problem or worry, while she will pass over as unimportant other problems or worries ... [mentioned] ... in the same reading" (p. 23). Just as with describing the client, sources of actuarial data can provide accurate insights into the nature of problems that present. Martin (1990) for example claims that the average marriage lasts seven years, with 50% ending within the first three years; the average weight gain in the first year is five pounds for each partner; and the most common causes of marital breakdown include broken promises and money problems, especially in so far as money decisions involve power, security, dependency and goals

4.6 'True' cold reading: using non-verbal feedback

The techniques described up to this point do not exploit information available through interaction with the client but depend instead on general truths and impression formation by the reader. When feedback *is* available during the reading, there is the opportunity to further refine these categories using what we have termed "true cold reading" (see Figure 4.6). This process has been linked by Hyman (1981) to the Clever Hans phenomenon (see Pfungst, 1911; Sebeok & Rosenthal, 1981) because it exploits subtle behavioural cues emanating from the questioner during the course of the interaction to arrive at an appropriate reading - in a manner not dissimilar to that used by the famous horse in answering observers' set problems.

It is achieved by forming initial hypotheses about the client which are informed by population stereotypes and environmental cues (as in pigeon holing). Here, however, these hypotheses are tested by introducing each topic (personality characterisation or problem area) in a generalised form and noting the client's behavioural response to its introduction. If it is positive, then the sketch can be elaborated a little further until another choice has to be made and the client unwittingly provides more feedback which steers the course of the reading. If the response is negative, then the reading is either moderated or the reader may "opt out" back to general categories to try the next one in the list[9].

When successful, the true cold reading can follow a tree-like path, from broad trunk to branch to twig as the implicit choices made non-verbally by the client become more esoteric, resulting in end points which give very specific information indeed. And the client will tend to only remember this end point, not the stages which led to it.

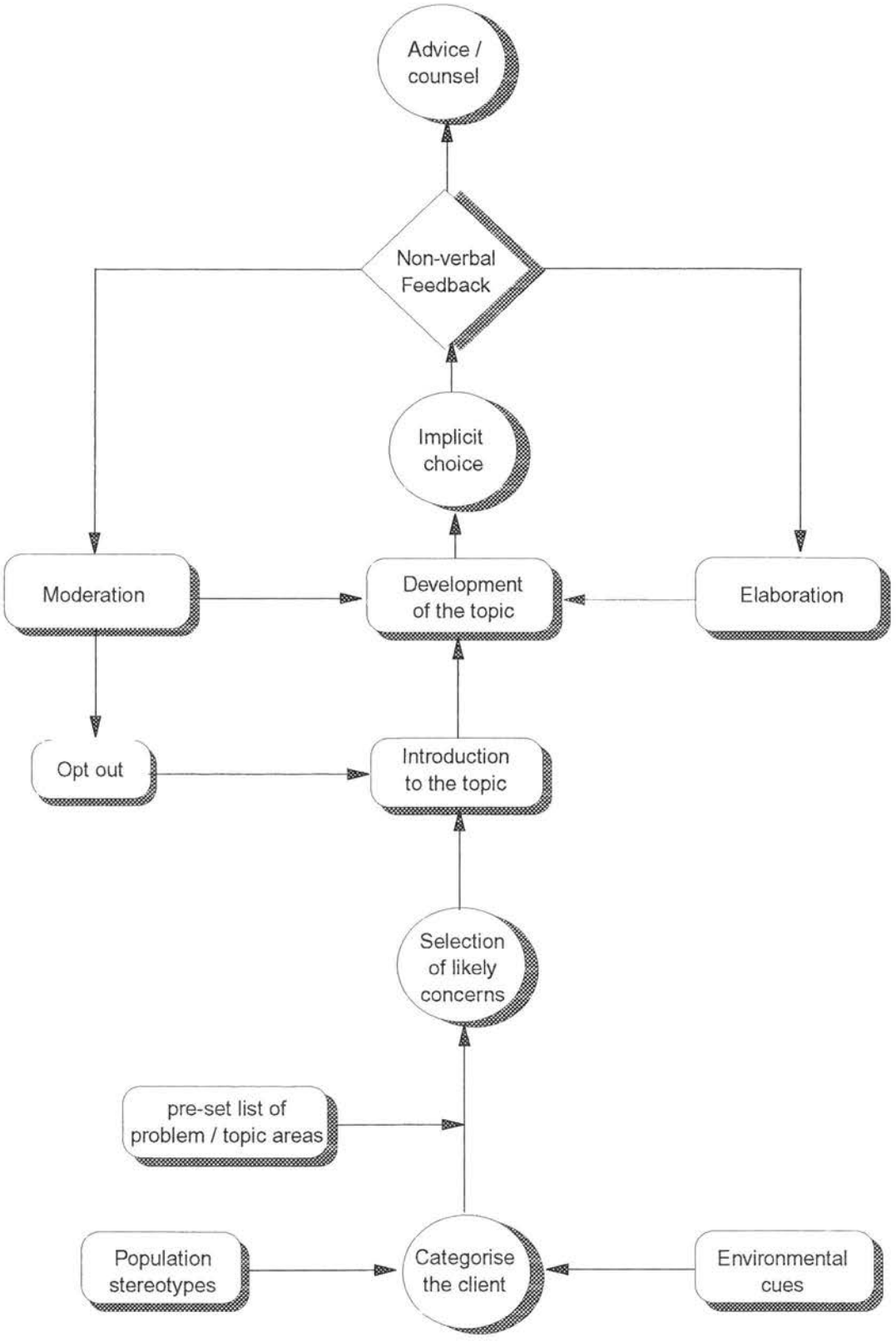


Figure 4.6: The 'true' cold reading using non-verbal feedback

Earle (1990a) illustrates the process by using Barnum statements as his starting point, but goes on to provide alternative elaborations according to the feedback he receives. For example, the initial statement "You pride yourself on being an independent thinker and do not accept others' opinions without satisfactory proof..." is followed after a positive response by "...and the proof has to be on your terms, not just formula and hypothesis. The understanding must come from within", but after a negative response results in the moderator "...you have, however, proven to have an open minded attitude. You are willing to listen to what other people have to say before making your decision". In the study with Davidson, different feedback in two of the readings turned a "holiday" into "just a day out with friends" after negative feedback, but a trip "...outside Europe ... India or Egypt ... don't be surprised if you end up galloping around the pyramids on a camel" when the client expressed interest in the topic.

The decision as to how to proceed depends on an ability to "read" the client's responses to what is being said, exploiting the conventions that exist for managing a dyadic communication. In normal conversation, the speaker looks intermittently at the listener, especially toward the end of utterances, to determine whether the listener is still interested in what is being said, and to gauge whether the listener wishes to take a turn as speaker (Duncan & Fiske, 1977). The listener reacts to this cue by producing behaviours which indicate essentially whether they are happy for the speaker to continue, whether they wish the speaker to change the topic of conversation, or whether they wish to take a turn as speaker. These behaviours,

known as back-channel signals (Wiener et al., 1972), can be expressed through a number of modalities. For example, interest is typically indicated verbally through vocalisations including uh-huh's and similar grunts (Argyle, 1988), facially through smiles (Brunner, 1979), and posturally through head nods, forward or sideways lean and drawing the legs back (Bull, 1987). Negative reactions can be signalled through frowning (Argyle, 1988), lowing the head or turning the head away, as well as adopting characteristics of a closed posture, such as folded arms (Bull, 1987). Pseudopsychics can similarly use these (generally unconscious) responses to gauge the appropriateness of what they are saying. In the pseudopsychic literature, commonly recommended measures indicating acceptance include eye blinks, leaning forward, dilated pupils, slight head nod, blushing. There are fewer signs for negative reactions, possibly since absence of all of the above would be taken as a negative reaction, but the few to be noted in the literature (e.g. Ruthchild, 1981) include slight frowning, folding arms, and looking away.

Many of the cues are quite subtle (e.g. some readers have suggested synchronising breathing patterns with the client so as to be sensitive to changes in that pattern) and their practical utility may be overstated. Jones (1989, pp. 50-74) does offer some interesting suggestions for ways to amplify these signals, including: dropping one's voice to force the client to lean forward, making nonverbal behaviour more apparent; having the client lightly rest the palm of her hand on the back of yours, to be able to utilize a form of muscle reading (also known as Hellstromism or Cumberlandism - see Whaley, 1989). Jones also suggests the use of some props to sensitively monitor

clients' reactions: a glass-topped table will allow one to monitor foot movements and to see the client's hands in her lap; swivel chairs which have been treated with water to encourage slight rust will squeak as weight is redistributed; prohibiting audio recording of readings but allowing the client to jot down notes provides a ready-made feedback channel indicating where the hits were, even to the extent that one may be able to read what was written.

There are likely to be considerable differences between individuals in the way they react to true or false statements. This can be overcome by taking measures of what constitutes a positive and/or negative response before the start of the reading-proper by using questions to which the answer is known or will be given without suspicion. Hobrin (1990) uses an introductory patter with questions like "Have you had a reading before?", "Did any of it come true?" etc, which are designed to provide such behavioural benchmarks.

4.7 Warm reading: using verbal feedback

From the above we can see that the essence of cold reading is the use by the reader of nonverbal feedback from the client to help him decide between a number of already-known alternative routes for the conversation. While cold reading requires the client unwittingly to deliberate between implicit choices produced by the reader, in what might be termed 'closed questioning' (e.g. "do you have children?"), in warm reading the emphasis is on the client to provide answers to 'open questions' to which the reader need not know the range of possible answers (e.g. "what are your

children's names?"). The process of warm reading is less constrained than that for cold reading (as for example was outlined in Figure 4.6), in that it need not follow such a fixed path of information gathering. Rather, warm reading is opportunistic, with the reader remaining alert to any personal details given up by the sitter at any time during the session from when she enters the room to when she leaves it.

Some of this information will be freely volunteered by the client if the reader has successfully developed a rapport with her, through mirroring her body language, appearing friendly and sincere, and expressing a wish to help with her problems. The client can be encouraged to speak - or to continue speaking - by reproducing the back-channel behaviours typically adopted by the listener in conventional conversational dyads[10]. Martin (1990) emphasises the importance of being able to listen, and to use listening body language:

> Nodding occasionally, in the sense of acknowledgement is a must. A slight sideways tilt of the head is also a listening signal you must learn to use ... Leaning slightly forward is standard; so is slowly ('thoughtfully') stroking the chin, almost as if you had a beard... This one action - attentive listening - is powerful magick [sic] by itself. For one thing, it is so rare for people to listen intently to them, that they want to talk on and on. It is a perfect way to get them to tell you their problem, and their tentative solution. (p. 78)

More 'aggressively', the reader can simply refrain from speaking. Earle (1990b) notes that "People abhor a silence the way Nature abhors a vacuum. The client will often fill the silence with material you can feed back later."

4.7.1 Fishing[11]

However, this haphazard method is unlikely to naturally produce all the information the reader wants to know. Other data will have to be teased out through 'fishing'. Hyman (1977) defines fishing as "a device for getting the subject to tell you about

himself", but as well as being rather vague, this definition tends to overlook the important characteristic of fishing - that the client doesn't realise (or at least recall) that she is the supplier of the information. Corinda (1984), for example, describes it as

> A process of verbal conjuring ... [in which] you have to make them tell you what they want to know - and yet they must not know they have told you. (p. 341).

Like cold reading generally, fishing is better defined operationally, and we will consider three versions here. In its crudest form, fishing involves simply asking the client for required information. Lewis (1991) for example, offers the following patter

> Do you drive a red or a silver car? No? Well I see someone close to you who has a car like that. Also "Is there someone around you who wears a uniform? No? You know there are different types of uniform? I think I'm seeing a nurse's uniform. No? I sense someone bringing you news of some sort, the person bringing the news wears a uniform. You will get benefit from the news, and so will a family member."

Where the client answers in the affirmative, the reader will be credited with a perspicacious hit. Where unsuccessful, the reader is able to moderate the prediction, for example. by widening its applicability, or transforming its meaning altogether. Here, the acquaintance in uniform smoothly becomes only the uniformed postman delivering a message from the acquaintance!

More subtly, fishing can involve using questions framed as if they were statements (Couttie, 1988). Here the client is encouraged to elaborate openly on a topic (which of course she has been privately doing for all elements of the reading) as the reader feigns difficulty in quite comprehending the meaning of his message, or is

apparently looking for confirmation for a received message. Figure 4.7 reproduces a conversation contrived by Couttie (1988) to illustrate how this is likely to work.

psychic:	*I'm getting something about a car crash?*
client:	*Yes ... my brother.*
psychic:	*Because he keeps talking about his shoulder. He's saying "It doesn't half hurt."*
client:	*He had head injuries*
psychic:	*That's right, dear, his head and shoulder are hurting. It was your brother wasn't it?*
client:	*Yes, that's right.*
psychic:	*He's saying "I was a fool for not doing up my seat-belt." He didn't do up his seat-belt did he?*
client:	*No he didn't, that's right.*
psychic:	*No, we haven't met before have we? I couldn't know your brother was in a crash unless I was in contact with him, could I?*

Figure 4.7: Fishing by using statements as questions (from Couttie, 1988)

The reader's initial statement is a fairly safe specific generalisation, which by the way it is presented stimulates the client to give up information which would be extremely difficult to guess at[12] (i.e. that the sitter has a brother who died in a car crash). It is important that the reader gives the impression that whatever information the client volunteers is already known to him. In reality, the reading would be much more chaotic than presented here, as the reader switches between topics and leaves much longer delays between fishing and feeding back the fish. This would increase the likelihood of the client misrecalling that the reader brought up the topic of her brother without any prompting from her. Davidson, for example, typically has three

stages to the reading; some palmistry, a Tarot card spread, and use of a crystal ball. Most fishing occurs during the palm reading, but is only fed back during the interpretation of cards (given the symbolic nature of the images, it is a straightforward matter to associate any gleaned information with one of them). The crystal ball allows Davidson to correct any errors by providing the opportunity to reinterpret any cards that he was 'unsure of'.

Another, equally useful form of fishing is the seeking of information about one topic while ostensibly giving information about another. For example, the statement "I get the impression that someone close to you, probably someone in the family, was quite ill recently, does that sound right?" apparently relates to health. In fact the client need only mention a spouse or partner, or son or daughter, for the reader to know that he can safely talk about relationship and family matters and events which only make sense in relation to them. Ideally suited to this purpose are the throwaway items like 'specific generalisations' and 'specific trivia' noted earlier. Once again, such information can be stored to be presented later in a modified form. To ensure that the client forgets where the details have come from, the reader employs some mis-direction, changing the topic of conversation, usually with the help of predictions derived from stock spiel statements (suggested, for example, by the next Tarot card in the spread). After a suitable delay the conversation can revert back to the original topic and this "new" information divulged, typically as an interpretation of a new card.

4.7.2 Hot reading

Although most readers don't generally need to resort to it, information about the client can be gathered in advance of the reading using methods collectively termed "hot reading". Hyman (1977) describes one form of hot reading when he outlines how

> If the reading is through appointment, the reader can use directories and other sources to gather information. When the client enters the consulting room, an assistant can examine the coat left behind (and often the purse as well) for papers, notes, labels, and other such cues about socioeconomic status, and so on. (p. 405).

Where the reading is held in the client's own home, this advance scouting for information can be very calculated.

> At some point, get up and say that you want a .. glass of water. Go into the kitchen and fill the glass. You are alone in the kitchen and you can stay there only a few seconds. But while you are there, find the calendar or notepad that is usually pinned up near the phone, the refrigerator or the back door. On it you will find a wealth of information about appointments, scheduled events involving your host or his family, peoples' names, phone numbers, etc...if you can get to the medicine chest, look for prescription drugs. Pain killers, tranquilizers, sleeping pills, drugs used in geriatric cases, all tell you something about his life... Knowing the name on the drug label, you know whether the patient is the host or his wife..
>
> Remember that any means is considered fair by the psychic hustler. You are trying to piece together a picture of your host's life and you are using every means to achieve the desired end. Everything is a clue, even the number of toothbrushes in the bathroom. You are doing nothing more than a detective does when trying to construct a picture of a victim's life, but of course your goal is entirely different. The detective is out to catch the culprit, but your aim is to set up the mark. (Fuller, 1980, pp. 13-14).

Keene (1976: 43-44) recounts a similar episode in his own past as a pseudopsychic. Lyons & Truzzi (1991, footnotes 60 & 61, p. 288) illustrate how organised this can be when they list professional and 'underground' sources which are often intended for the private detective market but which can be exploited by pseudopsychics. These books run under titles such as *How to get anything on anybody* (Lapin, 1983), and outline methods for locating individuals and finding out about them. Keene

(1976) also describes how the network of pseudopsychics themselves can be used as an information-sharing resource, by exchanging files containing personal details of regular sitters. Among themselves, mediums often refer to such files on sitters as their 'poems' or 'poetry', to be meditated upon immediately prior to a sitting. These poems often adopt a standard format:

> A cross beside a name means the individual is dead; a circle, that he's alive. A heart next to the name indicates someone with whom the sitter was in love. "G.G." next to "Blue Star" would mean that a medium had assigned the sitter a girl spirit-guide named Blue Star. (Keene, 1976, p. 38).

Jones (1989) has devoted whole chapters to describing how information supplied by a prospective client in booking an appointment can give an insight into their circumstances. For example, he lists eleven pieces of information which may be found on a cheque, should the client pay in advance. These include: postdated cheques indicating the imminent receipt or deposit of money; outsize cheques indicating that the client runs her own business; cheques under a pseudonym often indicating employment in the entertainment world. When presented within the framework of the psychic reading, information derived from these sources can be accurate and specific enough to be very difficult for the client to account for except in terms of the reader's claimed psychic ability.

4.8 Why should such readings be successful?

Although the cold reading may be capable of generating quite accurate information, due in part to the client's effort after meaning and their tendency to forget what wasn't true and to embellish what was, it can be argued that this only partly explains

the success of the psychic reading. Hyman (1981) notes that although it is unlikely that the pseudopsychic reading will generate information which is truly new to the client, it may still have utility for them, as "He or she may have a new insight into the conflicts and problems that precipitated the consultation. And new alternatives for coping with the situation may have been opened up" (p. 179). Dean (1986/7) has commented that "For every Western astrologer who concentrates on prediction there are probably another two who concentrate on psychology and counselling. The popular view of Western astrology as consisting of prediction and nothing else is incorrect" (p. 168). And Jones (1989) reflects:

> It is an entrancing experience, having one's life described by a stranger. It's an exercise as seductive as looking at a photograph of one's self. At the very least, what (you get for your money) [sic] is an attentive listener and guilt-free self-absorption ... Indeed there are some who maintain that today's practicing psychic is the poor man's analyst. (p. 5)

There may still be a stigma attached to visiting a mental health worker or counsellor, particularly among the working classes; according to Ruthchild (1981), visiting a psychic may provide a socially acceptable alternative forum for talking though one's problems and concerns. Pseudopsychics are generally aware of their role as counsellors, and often echo the Hippocratic admonition to 'first do no harm', avoiding offering independent advice but preferring instead to provide non-judgemental support for the decision already reached by the client. Corinda (1984) for example, comments

> One thing is vital knowledge to the reader and should never be forgotten; that is, nearly all clients ask a question which has already been considered by them and they have invariably formed their own opinions as to what to do ... make it a rule to find out what they have decided they should do - and you advise the same. (p. 351).

A common scenario is that of a client who has some important or unpalatable life-decision to make. Bascom Jones (1989) notes that such people "know what they ought to do but can't find the courage to do it. What these people need is self-confidence and belief in themselves ... [I just] give them a push in the right direction." (p. 6). In this way, the client can be relieved of some of the responsibility for their choices and actions, as any blame can later be laid at the door of the reader.

There is some evidence to suggest that readers can be quite skilled in the art of counselling. Lester (1982) has considered parallels between the psychic reading and other more orthodox forms of therapy, and noted a number of commonalities, which left him impressed with the readers' competence at the counselling process. Sechrest & Bryan (1968) found the advice offered by astrologers to be realistic, and usually vigorous, personal and friendly, and concluded that such consultations were unlikely to be damaging and probably represented a great bargain because they were relatively cheap. Dean (1986/7) concludes that "In a society that denies ego support to most people, astrology [and presumably other forms of divination] provides it at a very low price." (p. 178). Thurstone & Reed (1984) surprisingly found that psychic readings, given at a distance by anonymous psychics were rated by paying clients as a more valuable source of counselling than more orthodox psychological techniques. This suggests that a reader may be able to provide a valuable service even if his claim to be psychic is untrue. There is great scope to further consider both the interpersonal expertise that the reader may possess, which may contribute to any

therapeutic effects, and to determine what criteria the client applies when evaluating the reading. This promises to be a fruitful area for future research.

4.9 Chapter Summary

This chapter began by describing how subjectively impressive psychic readings have been accounted for in terms of deceptive practices known as cold reading. Existing characterisations of cold reading were criticised as too vague and inconsistent to be useful. A new model of cold reading strategies was elaborated, informed by a review of magic literature concerned with pseudopsychic techniques, and by an exploratory study with a practicing pseudopsychic. These suggested that cold reading may be more usefully regarded as consisting of a number of discrete strategies which generate information about the client in different ways. These strategies were described and illustrated. The methods were characterised as falling into a hierarchical arrangement. Those lower down the hierarchy are effective under conditions of impoverished feedback, but are capable of only relatively general information. Indeed, their primary purpose often is to act as a platform for more sophisticated methods, since the generation of more specific information by 'higher' strategies can be dependent upon the use of more basic methods to provide the material necessary to encourage reactions from the client or to misdirect them away from their own contributions.

The information produced by the basic use of a stock spiel (made up of Barnum statements, specific generalisations and specific trivia) is qualitatively different from

that produced by the more sophisticated methods. When used together with more interactive techniques, these strategies can provide a well balanced reading which deals equally well with the general picture as it does with specific details. Thus it is as likely to tell a client that she will live to a ripe old age as it is that she has three cats and a dog. Very little work has been done to find out what type of information or advice is most likely to convince the client of their paranormal origin, but it is not necessarily the most specific or improbable items. Richards (1990) illustrates this when he states

> A reading might contain the evidential statement that, "You have a husband with a glass eye", but the value derived from the reading is assigned by the client to statements like, "You need to relax more at home and communicate more effectively with your husband." (p. 278).

This account of the pseudopsychic reading draws attention to the fact that all the information emanates from the client in one way or another, making it very unlikely that she will be presented with material that is particularly new or surprising to her. It is unlikely, then, that the primary reason for the success of many psychic readings is the psychic or predictive function, and it is suggested that the primary role may be as a therapeutic, quasi-counselling event.

[1] An earlier version of this chapter was presented at the 1991 Parapsychological Association Convention (Roe, 1991). I would like to thank Professor Morris. others at the unit, and two conference referees for their helpful comments on earlier drafts of the paper. Thanks are also due to Richard Wiseman for his assistance in running the pilot study.

[2] There are exceptions. See, e.g., Roll et al. (1973).

[3] Despite this not requiring the reader to come to the reading 'cold', which would seem to be the essence of cold reading.

[4] A pseudopsychic can be defined here as a person who produces information or effects which are claimed to be the result of special psychic abilities, but which are in fact generated through normal means.

[5] Actual ages of sitters were not recorded.

[6] The terms 'sitter' and 'client' are used interchangeably here to refer to an individual who has solicited a reading from a professional psychic.

[7] In this paper I have adopted the convention usually found in the pseudopsychic literature, in which the reader is given as male and the client female. This has been done merely for ease of description and need not reflect any sex biases in mediumship, although the vast majority of pseudopsychic books have been written by men, and Jones (1989: 16) claims that 8 out of 10 readings are for women.

[8] These categories may not be as discrete as implied here, but may rather represent poles on a continuum of specificity.

[9] Davidson has drawn a parallel with the passage of a ship from Liverpool to New York; the course isn't fixed from the outset, rather the ship travels a little way, checks its position and modifies course, travels a little further and does the same. As the ship nears its end destination, the modifications in course become increasingly subtle.

[10] These signals mainly reflect the same back-channel signals discussed earlier in relation to behaviours emanating from the client in response to the reader's communication. The reader offers the same behaviours (head nods, smiles etc..) to encourage the client to continue to speak.

[11] Also (more commonly) known as 'pumping' (Whaley, 1989).

[12] This seems to be very much akin to Boerenkamp's (1986b) "rhetorical statements", which are rhetorical in the sense of "being concerned with effect ... rather than content or meaning" (Collins dictionary, 1988) rather than in the sense of the rhetorical question which is specifically intended not to elicit a response from the listener. Rhetorical statements are apparently generated quite frequently in the readings of subjects claiming genuine psychic powers.

Chapter 5: Pseudopsychics & the Barnum Effect[1]

5.1 Introduction

5.1.1 Introduction

We have seen that the success of the pseudopsychic reading is dependent, at least in part, upon the client's willingness to accept the stock spiel as an accurate description of themselves. In particular, it has been argued that by accepting the content of a reading, clients are displaying their susceptibility to the Barnum Effect. This effect has been defined by Dickson & Kelly (1985) as "the psychological phenomenon whereby people accept general personality interpretations as accurate descriptions of their own unique personalities" (p. 367). Indeed, we have already noted that Earle (1990) has actually recommended that aspirant pseudopsychics use a crib sheet made up exclusively of Forer's (1949) original set of Barnum statements. However, this is very much the exception, and many recommended personality descriptions are of a form which shares what may only be superficial similarities with the Barnum personality sketch, as the two presentations respond to the different expectations of their intended audiences. Thus while the comparison seems plausible enough, the claim that pseudopsychic statements are accepted because they utilise the Barnum effect must remain as yet unsubstantiated.

Research on the Barnum effect has been considerable; to date, there have been three substantial reviews of Barnum literature (Dickson & Kelly, 1985; Furnham & Schofield, 1987; Snyder et al., 1977), which together refer to over seventy independent studies. Typically, these studies are presented to Ss as an attempt to further evaluate some assessment device (such as a Rorschach test) by considering how successfully it can describe respondents purely on the basis of their responses (such as their interpretation of Rorschach inkblots). Ss complete the measure, and after some delay are provided with personality feedback ostensibly derived from it. In fact, all Ss are provided with the same personality sketch made up of general statements. These statements are rated according to the degree to which the S believes them to be true of themselves. Ss tend to be very impressed with the accuracy of such feedback (see e.g. Ulrich et al., 1963), which can even lead them to have elevated faith in the assessment device or the diagnostician him/herself (Snyder et al., 1976).

Much of the literature has concerned itself with attempts to characterise the factors that may induce acceptance, and has concentrated on three broad areas, namely (i) characteristics of the subject, (ii) characteristics of the feedback items, and (iii) characteristics of the context in which (sham) assessment occurs and/or feedback is given. The findings of these studies have generally been disappointing, producing equivocal or at best weak effects (cf. Furnham & Schofield, 1987). Of these, however, the most robust have been associated with aspects of Ss' personality which may be seen as reflecting some general concept of 'gullibility' (but for an alternative

characterisation see Johnson et al., 1985; Layne, 1979; Standing & Keays, 1987). In particular, high acceptance of Barnum statements has been associated with Ss expressing a high need for approval (Mosher, 1965; Orpen & Jamotte, 1975; Snyder & Larson, 1972), and with external scores on measures of locus of control (Orpen & Jamotte, 1975; Snyder, 1974; Snyder & Shenkel, 1976).

Should pseudopsychic statements be exploiting the same mechanism which induces Barnum acceptance, then they may be expected to show similar covariance with such personality factors. This study represents an attempt to empirically test the claim that pseudopsychics are indeed utilising the Barnum effect when they recommend the use of a stock spiel.

5.1.2 Expanding the Barnum statement pool

This study also offers the opportunity to expand the existing pool of Barnum statements. An important consideration in evaluating attempts to characterise such statements is the extent to which the statement pool used in research is sufficiently representative of all statements which induce the effect. The broader the range of the pool, the more confidence we can have that identified relationships (such as with favourability or generality) do not represent artifacts of idiosynchratic items. A number of researchers have previously attempted to expand the pool of Barnum statements by introducing new items (a full list of generated statements is given in an appendix). This work is briefly reviewed below.

Paterson's original profile was devised for use in luncheon club lectures, and no insight is given into how items were selected (see Forer, 1949). Forer was not aware of Paterson's sketch at the time of his classic study and so generated his own statement set (see Figure 4.3). These were drawn primarily from a newsstand astrology book[2], and were selected for their 'universal validity' (which Forer defined as "[a statement] which applies equally well to the majority or totality of the population" [p. 118]). Sundberg (1955) generated additional fake descriptions from "judges selections" without giving any detail as to what constraints were imposed upon selection, although he subsequently characterised 'successful' items as possessing at least one of three properties of vagueness, favourability, and double headedness (see section 4.3.3).

Marks and Seeman (1962) have attempted a more rigorous item selection. They applied item analysis to descriptions offered by 9 therapists concerning 9 patients, to reveal 19 items which failed to discriminate between them. However, this study was concerned to restrict the application of the Barnum effect to clinical settings and strove to emphasise those characteristics of triviality and high base-rates, which they felt to be in the tradition intended by Meehl (1956) and Paterson (Forer, 1949), and in de-emphasising other characteristics such as statement favourability. Not surprisingly, items so generated have a distinct clinical flavour to them, (for example: "Is relatively free from disgusts and inversions" and "Utilises displacement as a defense mechanism"), and are clearly of limited value in broader (and more typical) Barnum contexts.

Mosher (1965) supplemented Forer's thirteen with highly favourable and unfavourable items from the MMPI rewritten into a second person singular form. The favourable statements were better accepted than the original Barnum sketch. Weisberg (1970) rated 70 individual personality statements which consisted of "revisions or replicas of statements described in ... Forer, 1949, Sundberg, 1955, [and] Marks & Seeman, 1962" (p.744), but no details of exactly which statements were included is given. In any case, only 24 of these (selected to represent three levels of favourability while matched for ambiguity, but otherwise unidentified) were implemented in the study. Dmitruk et al. (1973) modified Forer's original statements to make them more or less favourable. Some of these changes seem likely to enhance the likelihood of acceptance, but overall there was no difference between acceptance rates for the positive and negative sketches. Snyder (1974), in a paper focusing on astrology, used a general sketch drawn from statements in Linda Goodman's book Sun Signs (Goodman, 1968) but no details are provided as to what these statements were. Furnham and Varian (1988, Study 2) used negatively worded versions of Forer's statements, but this gave rise to formulations which appear unsatisfactorily artificial (e.g., "You do not have a tendency to be critical of yourself", and "You have found it wise to be too frank in revealing yourself to others"). General statements taken directly from Forer (1949) were identified by Johnson et al. (1985) as positive or negative. To these were added specific statements which were devised following the general rules for Barnum statements offered by Sundberg (1955).

Efforts to systematically validate Barnum statements beyond some subjective measure of face validity during selection have been rather limited. Indeed, many of the more recently-constructed items even have poor face validity; they appear contrived and don't scan well (such as in Furnham & Varian, 1988), or else it seems unlikely that they would truly qualify as Barnum statements as they are too specific or unlikely. The best statements derived to date still seem to be those proposed by Forer (1949) and even more so those given by Paterson and by Sundberg, which suggests that little progress has been made in developing a Barnum pool beyond the classic items. Exploring the characteristics of recommended pseudopsychic statements offers an opportunity to expand the Barnum pool using the fundamental criterion of acceptance rather than in terms of supposed primary characteristics of Barnum items[3].

The present study was designed to assess whether the statements recommended and used by pseudopsychics could replicate the performance of traditional Barnum statements when presented in the context of a conventional Barnum study. Replication here would consist of similarly high general acceptance, and similar covariance with individuals scores on measures of need for approval and locus of control. If the effect is replicated, it supports the notion that the Barnum effect is influential in pseudopsychic readings, and that such items can be legitimately used to expand the Barnum pool. Thus it is predicted[4]:

H_1 : Acceptance levels for the pseudopsychic items will differ from those for traditional Barnum statements.

H_2 : Acceptance levels for pseudopsychic statements will covary with Barnum acceptance across individuals, such that high scorers on one will also score highly on the other.

H_{3a} : As individuals' scores on a measure of locus of control tend towards the external, so their acceptance levels for Barnum items will increase.

H_{3b} : As individuals' scores on a measure of locus of control tend towards the external, so their acceptance levels for pseudopsychic items will increase.

H_{4a} : As individuals' scores on a measure of need for approval increase, so their acceptance levels for Barnum items will increase.

H_{4b} : As individuals' scores on a measure of need for approval increase, so their acceptance levels for pseudopsychic items will increase.

5.2 Method

5.2.1 Materials

Discrete items consisting of between one and four sentences were drawn from the pseudopsychic literature[5]. Repetitions of items from different sources, or items expressing similar themes, were omitted to give an initial pool of potential Barnum statements (henceforth referred to as pseudopsychic statements). Other changes were made to some items in order to increase their appropriateness to the given context (i.e. so that they would be plausible as feedback from a projective test). Changes were only made at the superficial level of, for example, replacing terminology associated with psychic reading (such as "I see you as..." or "I get the impression that you...") with wording more typical of psychometric feedback (such as "You are..." or "You have found...").

Despite these changes, some items are by their very nature unsuited to presentation via a 'traditional' Barnum protocol, since they make predictions about the client's future which would not be likely to be revealed through completion of a psychometric test, no matter how 'mysterious'. To overcome this, all pseudopsychic statements were assessed independently by 5 judges (members of the parapsychology unit at Edinburgh) who rated the likelihood that the information revealed could legitimately be gleaned - or readily inferred - from information contained in a projective measure. It was not important here to generate an actual measure of likelihood, but rather to reflect Ss' likely satisfaction with the information they would be given, and thus maintain their faith in the dummy protocol. Using a six-point scale, where 1 = certainly detectable and 6 = certainly not detectable, only those items with a total rating of 15 or less (which equates to a mean rating of 3 or under) were retained to give a pool of 30 items for use in the study.

In order to ensure that Ss were given a manageable amount of feedback to evaluate, statements were divided randomly by E using random number tables (RAND, 1955) into two subgroups (A and B), each containing 15 items. To these were added a set of fifteen Barnum statements drawn from items used by Forer (1949), Sundberg (1955), and Paterson (1955) so that each sketch consisted of 30 statements. A full list of items is given in the appendix.

The study made use of a sham context in which Ss were given the House-Tree-Person projective measure (Buck, 1949) because the test's assessment method was seen as being suitably vague or "mysterious", a factor which has previously been shown to facilitate acceptance of Barnum statements (Richards & Merrens, 1971; Snyder, 1974).

5.2.2 Subjects

Forty-four volunteers acted as Ss, of whom 9 were male and 35 female. Previous studies (e.g. Halperin et al., 1976; Snyder & Shenkel, 1975) have indicated that sex differences have little influence on strength of the effect and so the biased sample was not considered problematic. Ss ages ranged from 18 to 37 with a mode and mean of 20 (std dev = 2.73).

5.2.3 Procedure

Second year psychology undergraduates at the University of Edinburgh were asked to participate in "a study to evaluate new assessment techniques for the House-Tree-Person test". Ss were approached individually or in small groups to enable a more relaxed but involved recruitment procedure, in which the dummy protocol was explained and questions answered. They were asked to decide whether to participate only after they were confident that they understood what would be expected of them.

Upon recruitment, Ss were given measures of locus of control (Rotter, 1966) and social desirability (Crowne & Marlowe, 1960) which were to be used ostensibly as sources of external validity for assessing the House-Tree-Person (H-T-P) feedback. These were completed at leisure and returned after approximately seven days when Ss met individually with the experimenter to undertake the H-T-P test. The test itself involved drawing a house, a tree and a person using any or all of a range of materials provided. It was emphasised that artistic ability was not an important factor, and that the test gave best results if the S relaxed and tried to have fun while producing his or her drawings. Ss were informed that the drawing(s) would be sent out to a team of people who had recently been trained to interpret this type of material in a more holistic and meaningful way than had previously been attempted. This was designed to prime them to be more open to the kind of psychic-reading-based information they would receive.

A further week later Ss returned to be given feedback. This was supplied in type-written form as discrete, numbered statements on a sheet marked with each S's own personal identification number. Statements were evaluated individually by S according to how well each applied to them, using a five-point scale from 1 ('almost entirely wrong') to 5 ('amazingly accurate')[6].

Ss were debriefed individually once they had completed the evaluation of feedback[7]. The debrief, which typically lasted between 30 and 60 minutes, concentrated on three issues: firstly, a justification of the necessity of an element of deception here in

order to elicit valid responses from them; secondly, an assurance that their acceptance of the dummy protocol did not reflect badly on them since great care had gone into generating a plausible cover story; and thirdly, an opportunity was given for Ss to work through their own thoughts and feelings about the study and to ask questions about the design should any aspect still be unclear to them. It is comforting to note that no subject exhibited any negative reaction (such as annoyance or embarrassment) to being informed of the true nature of the study. Rather, the typical reaction was one of pleasant surprise, with many being intrigued by the relative complexity of the design.

5.3 Results

5.3.1 Comparing the two subsets

Mean ratings for pseudopsychic statements did not differ for subsets A and B [$U = 101.0$, $p = .89$, 2-tail] suggesting that the two statement sets were comparable. Similarly Ss allocated subsets A and B did not differ in their degree of acceptance of conventional Barnum statements [$U = 261.5$, $p = .611$, 2-tail]. It was therefore felt appropriate to combine data for subsequent analyses.

5.3.2 Comparing acceptance ratings for pseudopsychic and Barnum statements.

Viewing the frequency distributions for the mean ratings of the two sets of statements (Figure 5.1) suggests that as a group, acceptance was higher for the Barnum statements than for pseudopsychic statements. Comparing mean acceptance rates for the two types of statement reveals that Barnum items were better accepted

to a highly significant degree [W = 75, n = 42, p < .0005, 2-tail], requiring us to reject the null hypothesis in favour of H_1. However, almost all of the pseudopsychic statements still achieved mean ratings which are *post hoc* significantly above the mid-value of 3 ("about half and half") [W = 27, n = 30, p < .001, 1-tail] and therefore tended to be accepted as true of the client.

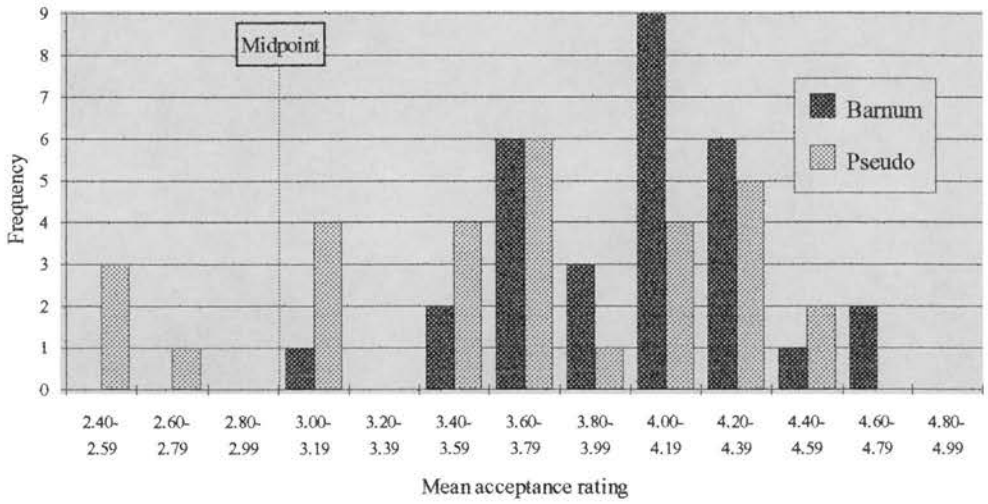


Fig. 5.1: Frequency distribution of mean acceptance ratings for Barnum statements and for Pseudopsychic statements

We can also consider whether acceptance of the pseudopsychic statement pool covaries with Barnum pool acceptance across individuals, which would be suggestive of both sets of stimuli adopting the same modus operandi, or exploiting similar intra-subjective variables (such as, though not necessarily, some general gullibility factor). Results from this study (Figure 5.2) suggests that they do. Correlating Ss' ratings for Barnum and pseudopsychic statements yields a highly

significant result [r_s = .597, n = 44, p < .0001, 1-tail], indicating a strong tendency for high scorers on one measure to score highly on the other, and low scores on one to be associated with low scores on the other, allowing us to accept H_2.

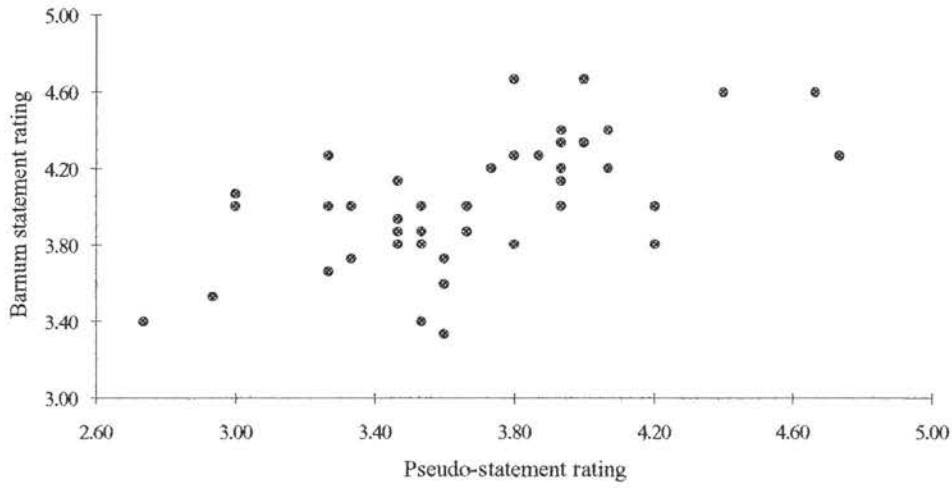


Figure 5.2: Scattergram of Ss' acceptance ratings for Barnum statements against acceptance for Pseudopsychic statements

5.3.3 Covariance of acceptance with personality measures

Ss mean ratings both for pseudopsychic and Barnum items were correlated with scores on measures of locus of control and need for approval. These results are summarised in Table 5.1. No significant relationship is evident between acceptance ratings for pseudopsychic statements and these personality measures [p = .953 and .516 for need for approval and locus of control respectively], and we therefore reject H_{3a} and H_{3b}. However, there is equally no relationship apparent between these

variables and acceptance of classical Barnum statements [p = .886 and .572 respectively]. Given the weakness of the correlations, which are likely to be due to chance, little store should be placed by the differences in the direction of the relationships between these variables and the two statement types.

	pseudopsychic statements	Barnum statements
Need for Approval	.009	- .022
Locus of Control	.100	- .086

Table 5.1: Correlation coefficients describing the relationship between Ss' personality and acceptance data.

5.3.4 Tests for the detection of confounding variables

It is, of course, possible that acceptance represents an artifact of situational variables linked to demand characteristics, to which some Ss are more susceptible than others (although this would not directly explain the greater success of Barnum statements over pseudopsychic statements here). A post hoc measure was taken to evaluate this likelihood. Two independent judges, who were unaware of the purpose of the study, rated Ss drawings in terms of the amount of effort which had been put in to making them, independent of any natural drawing ability. Presumably, Ss who were more sensitive to situational pressures such as demand characteristics would be more likely to work longer or harder in producing their drawings. Alternately, Ss who had spent longer on their drawings should feel greater pressure to accept feedback that was ostensibly based upon it (cf. Festinger & Carlsmith, 1959; Linder et al., 1967).

Although the judging criteria were loosely defined, there was a reasonable degree of inter-judge agreement [$r_s = .576$, $n = 44$, $p < .0001$, 1-tail]. The mean effort rating so obtained for each drawing was compared with Ss' feedback ratings. Neither comparison approached significance [for Barnum, $r_s = -.076$, $p = .618$; for pseudopsychic, $r_s = -.068$, $p = .654$], suggesting that situational factors of this sort at least were not influential in subject acceptance.

Another potential confound which can be considered here could be termed a "scepticism variable" since it reflects Ss scepticism in the assessment measure and in the proposed attempt to broaden the range of information given as feedback, as suggested by the sham context. This can be assessed by comparing judges' pre-study ratings of the likelihood that the information would be readily available to a projective measure such as the House-Tree-Person test with subsequent acceptance ratings for those items. Statements rated as least likely to be available to a projective measure would presumably also tend to be regarded by Ss as the most speculative or tentative suggestions made by an assessor experimenting with the new-found freedom of interpretation. However, correlating mean judge rating with mean acceptance rating for each pseudopsychic statement[8] gives a negative but non-significant result [$r_s = -.126$, n.s.].

5.4 Discussion

Although the results do not provide wholehearted support for the notion that pseudopsychics are (wittingly or unwittingly) making use of the Barnum Effect in their selection of material, there is some room for optimism. In particular, the reasonably strong correlation between Barnum and pseudopsychic statement acceptance is perhaps a little surprising, given that the two sets of items exhibit significantly different acceptance levels.

How can the two findings be accorded? A plausible explanation is that the pseudopsychic statements represent a weak subset of Barnum statements, whose performance is not quite as extreme as that of the latter, but which shadows their characteristic variation across individuals. It does seem unlikely that this covariance can be explained simply in terms of some individuals increased susceptibility to demand characteristics, since those Ss targeted as especially prone did not exhibit greater levels of acceptance. Indeed, it should be noted from the distribution of mean acceptance ratings for pseudopsychic statements given in Figure 5.1 that it may be the inclusion of a few outlier statements that would not qualify as Barnum statements (indeed they fail the principal criterion of achieving a mean acceptance rating of 3.0 or better) which serve to depress the performance of the whole sets of items in relation to conventional Barnum statements.

The pseudopsychic literature may therefore provide a fruitful source of items to enable the pool of Barnum statements to be expanded. A number of researchers have

previously attempted to introduce new items, but the selection process has often been very haphazard, with very little effort made to systematically validate them beyond some subjective measure of face validity. For example, Paterson's original profile was devised for use in luncheon club lectures, and no insight is given into how items were selected (see Forer, 1949), and Sundberg (1955) generated additional fake descriptions from 'judges selections' without giving any detail as to the criteria used for selection. Yet these items are still preferred as stimulus materials (e.g. Johnson et al., 1985). Pseudopsychic statements do at least lay claim to face validity, since they are recommended on the grounds that - it is claimed - they are generally accepted as true by clients.

The distribution of acceptance ratings does seem to support the consensus that important characteristics of Barnum statements are their generality and favourability (cf. Furnham & Varian, 1988), since the pseudopsychic statements which did not fare so well give descriptions which are relatively specific[9] (e.g. "Children play an important role in your life") or relatively negative in orientation (e.g. "Your life hasn't developed exactly the way you expected or would have liked. Many of your goals and plans have failed to materialise"). However, this is not a hard and fast rule, as other apparently negative statements (such as "There are times when you felt your life is one long battle...") are nevertheless accepted. The determining factor appears to be a generality / vagueness attribute which these items possess, and which presumably allows the subject to interpret the statements in a less ego-threatening manner. It would be interesting to see whether Ss did show evidence of interpreting

Barnum statements in this way. Research attempting to characterise the properties of Barnum statements has thus far met with only limited success (see Furnham & Schofield, 1987), and further work certainly needs to be done in this area.

Some researchers have drawn attention to a self-other asymmetry, according to which Ss do not recognise that statements which they accept as true of themselves are equally likely to be true of others (cf. Johnson et al., 1985). While this is not yet considered a defining characteristic of Barnum statements, it would nevertheless be interesting to see if this property is also common to pseudopsychic statements. However, the present study was not concerned with characterising the properties of statements which cause them to be generally accepted, but rather was designed to determine whether pseudopsychic statements act in a similar manner to Barnum statements. Only once this general acceptance has been established does it become meaningful to investigate the characteristics which may induce it.

In retrospect, the item describing Ss as "above average in intelligence" is problematic given the undergraduate population used here, for whom it is presumably a truism. We share the surprise of one referee in noting that the mean rating for this statement was 'only' 4.18, suggesting that unless our Ss are particularly concerned to express humility, they are not simply reflecting on the objective truth of statements, but are offering a subjective interpretation.

There could be *a priori* grounds for expecting pseudopsychic statements not to perform quite as well as classic Barnum statements, because many of the former were generated with a very different context in mind; however, this argument is not supported here. Judges ratings of the appropriateness to the context of particular information were not able to predict Ss' subsequent acceptance levels to any significant degree. This notwithstanding, the psychic reading environment undoubtedly places alternative emphases on the type and form of information to be elicited, and the transformations which were necessary to generate appropriate pseudopsychic statements may not have been totally successful. The relative impact of the two sets of items may be markedly different if presented in a context which more accurately simulates the psychic reading environment. There is also a danger that the items which survived the selection process may no longer be representative of pseudopsychic statements generally, consisting instead of a particular subset with distinct (selected) characteristics. The selection process, however, was inevitable given the need to maintain the supposed purpose of the study. If future studies were to present items in different contexts (e.g. as feedback from a psychic reading) then they would not be so constrained.

Initially, it would also seem surprising that neither acceptance of Barnum nor of pseudopsychic statements was correlated to any degree with the personality measures of locus of control and need for approval, which represents a failure to replicate the findings of others (Mosher, 1965; Orpen & Jamotte, 1975; Snyder & Larson, 1972; Snyder, 1974). However, it should be noted that the effects previously reported have

generally been quite small and inconsistent (e.g. Fichten & Sunerton, 1983), suggesting that even where such personality measures have some influence, theirs isn't the primary motivation towards acceptance. It could be argued that the generally high acceptance of statements across all Ss generates a ceiling effect which limits the amount of variance in scores within each factor, thereby artificially reducing any estimate of correlation between them. We await further work to resolve the relative influence of such factors upon Barnum acceptance.

5.5 Chapter summary

This chapter describes a study which considered whether statements used by pseudopsychics in ostensibly psychic readings are accepted as true by clients because they exploit the Barnum Effect. Material drawn from the pseudopsychic literature was mixed with classic Barnum statements and given to 44 Ss ostensibly as feedback from a projective measure completed earlier. Ss rated the degree to which they felt the statements were accurate in describing them. Comparing the performance of the two statement sets indicated that the Barnum items were more strongly accepted, but that acceptance of the two item types covaried across Ss. It was suggested that this was unlikely to be due to differential susceptibility to demand characteristics. Attempts were made to account for these findings by proposing that a subset of outlying pseudopsychic statements which did not induce acceptance may have served to depress the performance of the set as a whole. The subset was characterised as being less general or favourable in form than is usually necessary to induce the Barnum Effect.

The results of this study suggest that pseudopsychics are recommending the use of some statements which act in a similar way to Barnum statements, and which are capable of eliciting similar (if not quite so extreme) personal validation from recipients. This would tend to support the contention offered by some commentators sceptical of the veridicality of psi (e.g. Dutton, 1988; Randi, 1981) that apparently impressive psychic readings are, in part, a consequence of Barnum acceptance coupled with faulty recall. Such an interpretation is in keeping with the general finding that psychic readers tested under controlled conditions do not seem to be more accurate in their predictions than would be expected by chance (cf. Boerenkamp, 1985, 1986; Schouten, 1993).

[1] A version of this chapter has been published in the European Journal of Parapsychology (Roe, 1995a). I would like to thank Robert Morris, Caroline Watt and two anonymous reviewers for helpful comments on earlier drafts of this paper.

[2] In their description of the origin of the Barnum sketch, Marks & Kamman (1980: 189) imply that Forer was stimulated to study the phenomenon by an encounter with a graphologist whom he accused of peddling statements that were true of everybody. In fact, Forer's interest was primarily in the consequences of such an effect for clinical diagnosis (which was equally susceptible to generating universally valid characterisations), although an "amicable discussion" (Forer, 1949: 119) with a nightclub graphologist may have led him to consider astrological sketches as a likely source of test material.

[3] This approach allows items so-chosen to be later scrutinised to determine whether possession of certain characteristics are indeed necessary for item acceptance (to be considered in a later chapter). If items were originally chosen by virtue of their possession of particular properties, then this second stage would not be feasible.

[4] The wording of this H1 is such that it can be directly tested. Given the assumed similarity of the statement types, I would expect this prediction not to be supported here. I am grateful to one referee for drawing attention to the difficulty of drawing meaningful conclusions on the basis of accepting the null hypothesis. However, we do not have to address those problems here, since the null was, in fact, rejected. Note also that if H_2 is supported, then H_{3a} and H_{3b} will not be independent, and similarly neither will be H_{4a} and H_{4b}

[5] Further details of the selection procedure are given in an appendix.

[6] This rather non-standard ratings scale (after Carrier, 1963) was adopted because it has a history of use in the Barnum literature and is still current (see e.g. Furnham & Varian, 1988). It would be counter-productive to introduce changes to the protocol just for changes' sake, in particular as this would restrict the comparability of these data with previous findings.

[7] It should be noted here that it is rare for accounts of Barnum studies to include details of how the deception was justified to Ss. The unfortunate implication is that little care has been taken to ensure Ss' subsequent psychological well-being.

[8] Note: we are restricted to considering the performance of pseudopsychic statements here, since no pre-test judgement of the appropriateness of classic Barnum statements was considered necessary.

[9] We might note here that Boerenkamp (1985) found that more than half of the statements produced by psychics in his study were regarded as having a greater than 1-in-2 chance of being true simply by chance.

Chapter 6: Acceptance of Barnum Statements as a Function of Their Perceived Properties[1]

6.1 Introduction

6.1.1 Introduction

Chapter 5 described how pseudopsychic readings make use of statements which appear to act in a similar manner to Barnum statements, although the effect seems to be watered down somewhat. An account of the success of the pseudopsychic reading simply by reference to the Barnum effect would not however provide a completely satisfactory explanation of the phenomenon, since it fails to give any insight into why individuals should be so accepting of general personality descriptions, or why they should find such feedback surprising and impressive. This chapter explores the nature of the effect in more detail by considering whether properties inherent in the statements themselves might contribute to their ready acceptance (see, e.g., Snyder et al., 1977).

6.1.2 Evaluations of statement properties

Despite the breadth of research, there are probably less than 50 mutually distinct statements which have been characterised as Barnum statements, as many studies made use of Forer's (1949) original set of 13 items (e.g. Carrier, 1963; Dmitruk, Collins & Clinger, 1973; Jackson & Murray, 1986; Merrens & Richards, 1970). These were selected relatively casually, drawn largely from a newsstand astrology

book using the loose criterion of "universal validity" (Forer, 1949: 120), although it has since been suggested that in fact many Barnum items are not perceived by subjects as universally valid (Baucome & Greene, 1979). Much effort has been devoted to identifying those characteristics of Barnum statements which are influential in facilitating their acceptance, and a number of candidates have been forwarded.

The first attempt to characterise Barnum statements was carried out by Sundberg (1955), who suggested that the better accepted stereotyped descriptions consisted of 4 distinct types, which he defined as;

> "(a) vague statements such as 'This person enjoys a certain amount of variety in his life', (b) double-headed statements such as 'He gets depressed at times but sometimes he is cheerful and rather optimistic', (c) Modal statements, i.e. statements which are frequently characteristic of the given group, for example 'One of the person's troubles is difficulty in concentrating.' (d) Favourable statements such as 'This person is optimistic and forceful and well-liked by others'." (p. 146).

Of these, the characteristics of vagueness (sometimes labelled as generality) and favourability have been the preferred focus of empirical investigations of statement properties, in part because they are somewhat easier to manipulate (see, e.g., Dmitruk et al., 1973). Some attempts have been made to generate statements that have double-headed or modal properties (e.g. Furnham & Varian, 1988), but because of difficulties in generating appropriate comparisons, their success is less clear-cut.

6.1.2.1 Favourability

That favourability should be important is in line with the "Pollyanna principle" which suggests that there is a universal human tendency to use or accept positive words or feedback more frequently and easily than negative words or feedback[2]. Studies which have manipulated this dimension have found that increasing the favourability of a sketch increases the degree to which it will be accepted (Layne, 1978; Mosher, 1965; Weisberg, 1970), such that preference for Barnum statements over 'actual' feedback may simply be a consequence of social desirability. Layne (1979) notes, for example:

> It is not surprising that a hypochondriac would accept the trivially accurate feedback that "security is one of your major goals" more highly than the uniquely accurate test-derived descriptor that "You incessantly complain of illnesses for which there are no real physical causes". (p 220).

To date, only one study investigating this phenomenon has failed to produce such a difference (Dmitruk et al., 1973), and the weight that should be attached to this result has been questioned (Snyder, Shenkel & Lowery, 1977; Dickson & Kelly, 1985), because the method used in the study to assess level of acceptance has been regarded as suspect; Dmitruk et al. (1973) used judges ratings of subjects' comments rather than ratings from subjects themselves, and it has been suggested that this measure may not have been sensitive enough to detect differential acceptance due to differences in favourability (Snyder et al., 1977). This explanation receives support from two conceptual replications of the Dmitruk et al. (1973) study which utilised subjects' own reported acceptance levels, and which did find that a favourable sketch

was more highly accepted than a less favourable one (Collins Dmitruk & Ranney, 1977; Snyder & Shenkel, 1976).

There may, however, be an upper limit to the degree to which increasing favourability increases acceptance. Hyman (1977) found that the optimal sketch included approximately 75% desirable and 25% neutral or undesirable descriptions. The latter seem to act to give balance to the sketch, making the positive statements more believable - much as an employer's reference must also make some attempt to record negative attributes of the employee to give the assessment credence. Interestingly, Hyman further recommends that the favourable items be relatively specific, whereas negative items should be recognisable as equally applicable to others.

6.1.2.2 Generality

Furnham & Varian (1988: 745) have indeed argued that acceptance of feedback is primarily a consequence of generality rather than favourability of feedback. There is some support for this in Snyder & Shenkel's (1976) discovery that the effect of favourability disappeared when the statement scores were weighted to take into account differences in independent ratings of 'truthfulness' (which might be regarded as a measure of general applicability).

A number of studies have demonstrated that general personality profiles are judged by subjects to be accurate descriptions of themselves (Carrier, 1963; Lattal & Lattal,

1967; Manning, 1968; Snyder, 1974; Snyder & Larson, 1972). Indeed, it has even been found that subjects perceive a 'fake' generalised interpretation as more accurate than interpretations actually derived from their personality tests (Dies, 1972; Greene, Baucom & Macon, 1980; Hampson, Gilmour & Harris, 1978; Merrens & Richards, 1970; O'Dell, 1972; Sundberg, 1955). It should be noted, however, that not all attempts to replicate have been successful. Greene, Harris & Macon (1979), for example, have suggested that the effect may be restricted to those unfamiliar with the personality constructs ostensibly being measured.

It is unclear in any case whether such acceptance is a result of the statement's generality (vagueness) per se. O'Dell (1972) has suggested that since general statements, by their nature, will have high base rates (i.e. simply be true of a large proportion of the population) it should not be surprising that they are regarded as more acceptable than sketches derived from many of the personality tests currently in use[3]. Indeed, some have argued that by definition, Barnum statements must have a high base-rate accuracy (Collins et al., 1977; Merrens & Richards, 1970; Snyder & Shenkel, 1976; Snyder, Handelsman & Endelman, 1978). Layne (1979) summarises this view when he asserts

> The Barnum effect consists of people rating accurate descriptions of themselves as accurate descriptions of themselves! Barnum descriptions are highly accurate, trivial favourable descriptions of all normal people. (pp 219-220)

However, the degree to which the items *can* be regarded as generally true is questionable. Baucom & Greene (1979), for example, found that only 7 of 12 typically used statements were rated as appropriate to all people, so that acceptance

of general statements cannot be explained solely in terms of base rates. Rather, it seems likely that only some items are effective because they are simply true of most people, while others may be vague enough for the respondent to project their own meaning into them (see Layne, 1979; Marks & Kamman, 1980). This strongly argues for more care to be taken in defining the variables under investigation in any given context.

6.1.2.3 Uniqueness.

If subjects were simply responding to descriptions with high base rates of incidence, then one might expect this to be reflected in their estimates of how applicable the Barnum sketch would be if presented to others. An explanation of Barnum acceptance purely or primarily in terms of the generality of feedback would fail to account for any apparent difference between evaluations of the applicability of items to oneself and to others.

Forer (1949) originally speculated that, in fact, individuals would accept the personality description for themselves while remaining oblivious to its applicability to others. Support for such a self-other asymmetry was first reported by Ulrich, Stachnik & Stainton (1963) by reference to respondents' spontaneous comments on receiving feedback. Representative comments they cited included "I believe this interpretation applies to me individually, as there are too many facets which fit me too well to be a generalisation" (p 833), which the authors interpreted as a lack of awareness of the general applicability of the sketch.

Ziv & Nevenhaus (1972) had subjects rate the accuracy of their personality description both for themselves and for people in general, and found that they regarded the sketch as more true of themselves than of others. However, they also reported that this effect was restricted to favourable items - unfavourable items were regarded as no less true of others. Snyder & Shenkel (1976) replicated this finding, including the interaction effect of favourability.

Two potential methodological artifacts have been forwarded to account for this asymmetry; firstly, that subjects are likely to be influenced by being told that the statement set was compiled 'specifically for them' - a manipulation of context which has been found to influence acceptance levels (Snyder et al., 1977, term this 'feedback relevance'); and secondly that the use of within-subjects measures to gauge the applicability of generalised feedback both to self and to others may cause subjects to be more sceptical in making the latter assessment than otherwise (Snyder et al., 1978).

Baucom & Greene (1979) overcame the first of these concerns by adopting a novel design. Rather than being presented with the sketch as personality feedback derived especially for them, subjects were given the statements as questionnaire items which they simply rated as true or false. Respondents also estimated the percentage of people for whom the item would be true. Although Baucom & Greene did not directly compare these measures, the present author was able to make a post hoc

comparison using reported frequencies. This analysis indicates that subjects underestimated the applicability of statements but not significantly so [mean estimate of incidence = 64%, whereas mean of actual incidence = 68.5%; Wilcoxon, based on individual statement ratings, gives a Z of -1.09, n.s.]. Johnson et al. (1985: study 1) similarly presented items as a questionnaire, but also used a between-subjects design in which subjects *either* rated applicability to self *or* to others to overcome any sensitizing effect. They still found that mean ratings for all of Forer's thirteen statements were higher for self than for 'someone you know', although only significantly so for seven of these[4].

Johnson et al. (1985) instead interpret the self-other distinction in terms of an illusion of uniqueness, brought about by cognitive error tied to the availability heuristic (Kahneman & Tversky, 1973). According to this model, subjects underestimate the prevalence of traits in others, so that the effect is a consequence of a failure to use population base rates in deriving judgements. This is supported by their finding (study 3) that when rating for others of different degrees of acquaintance there was a decline in applicability with 'distance'. However, Baucom & Greene (1979) did find that their subjects were able to reliably estimate the proportion of their fellow students who would answer 'true' to each of a set of statements, implying that they did have some appreciation of actual base rates.

In any case, Johnson et al. (1985) found that the self-other distinction was confined to ratings of positive sketches, as there were no differences in ratings of applicability

for negative descriptions. This is in keeping with a general positivity bias (for reviews see Greenwald, 1980; Taylor & Brown, 1986), and may be better accounted for in terms of characteristics of self-perception generally. It is well documented, for example, that one's poor abilities tend to be perceived as common, but one's favoured abilities are seen as rare and distinctive (Campbell, 1986; Marks, 1984). Similarly, individuals have been found to judge positive personality attributes to be more descriptive of themselves than of the average person, but see negative attributes as less descriptive of themselves than the average person (Alicke, 1985; Brown 1986; Messick et al., 1985). Since Barnum statements are predominantly favourable, they may thus come to be regarded as more true of the respondent than people generally.

It has also been found that subjects tend to rate themselves higher than do their peers on internal dispositional characteristics whereas their peers tended to rate them higher on traits especially visible to an external observer (Funder, 1980). If Barnum statements can be regarded as focussing on internal traits, then this may offer a further alternative account for the self-other asymmetry.

It must be noted, however, that not all studies have found a self-other distinction; Greene (1977) for example, reported that although subjects rated generalised personality sketches as being accurate, they recognised that it did not describe them as a unique person. Harris & Greene (1984) also report that subjects are certainly capable of recognising Barnum feedback as more accurate but less unique than test-derived feedback. Greene et al. (1980) manipulated the generality of a sketch

and found that subjects were similarly aware that the more general sketch was more accurate but less unique. These findings need not be contradictory, however, if they simply reflect different strategies for measuring 'uniqueness'. In the former studies, uniqueness is gauged by having subjects rate the applicability of items to others; in the latter a more direct measure is taken of how well the sketch describes them as a unique person. These definitions of uniqueness are not complementary, as it is certainly possible for an item not to apply to people generally (i.e. lack *universal* validity) yet still not qualify as a *wholly unique* characterisation of the respondent (Dickson & Kelly, 1985, have offered a similar argument).

6.1.2.4 Triviality / Usefulness

Greene (1977, 1978; Harris & Greene, 1984) has argued that subjects are capable of recognising that general statements are only accurate in a trivial manner. High acceptance is thus simply an artifact of the type of assessments respondents have been asked to make, which typically focus on accuracy alone. As Harris & Greene (1984) note:

> the perceived accuracy of personality interpretations is a necessary but not a sufficient condition to make such a judgement. In studies where other dimensions of personality feedback, such as its usefulness to the student, have been explored, actual personality feedback has been rated significantly higher than trivial [Barnum] feedback. (p. 180).

They investigated subjects' responses to their feedback in more depth by having them rate it along 6 dimensions; (a) 'How accurate is the information?'; (b) 'How well does the information describe you as a unique individual, that is, as different from others?'; (c) 'How well does the information help you to imagine yourself behaving

differently?'; (d) 'How well does the information reveal new information about yourself?'; (e) 'How well does this information help you to see something you already knew about yourself in a new light?'; and (f) 'How useful is this information?'. They reported that Barnum information was seen as more accurate than test-derived feedback, but as less useful, less unique, and as containing less new information, although the type of feedback did not differentially affect students' ratings of changing their own behaviour nor of seeing something they already knew about themselves in a new light.

The respondents in Harris & Greene's (1984) study were rating feedback which they believed to have been specifically derived for them, but similar results have been reported where independent judges rated feedback. Schroeder & Lesyk (1976) compared judges' ratings for Barnum statements with those for "genuine" statements drawn from MMPI. The statements were rated along four dimensions; (a) the amount of information contained in the statement; (b) the degree of usefulness of the statement for understanding the stimulus person; (c) the degree of social desirability of the statement; and (d) how typical the statement is of people generally. They found that expert judges rated Barnum feedback as being more socially desirable and more typical (general), but as having less information value and as being less useful than 'genuine' feedback[5]. However, naive judges were only able to distinguish between statement types on the dimensions of generality and social desirability. Although these properties seem to distinguish the Barnum sketch from test-derived

feedback, it is still unclear whether they represent defining characteristics of the Barnum set and perform a role in inducing item acceptance.

6.1.3 General shortcomings

Research on statement characteristics tends to follow a standard experimental method of manipulating statement properties to generate dichotomous conditions in which the sketch is, for example, favourable versus unfavourable (e.g. Collins et al., 1977; Dmitruk et al., 1973; Mosher, 1965), or general versus specific (Furnham & Varian, 1988). This approach can be problematic, however, in that some of the statement versions so-produced can seem terribly artificial or forced, and could potentially give rise to artifactual responses (e.g. Dmitruk et al., 1973: "You are seldom constructively critical of your own actions"; Furnham & Varian, 1988: "You have found it wise to be too frank in revealing yourself to others.").

It may also be contended that some of the dimensions are poorly defined, so that it is unclear exactly which variable is being considered. For example, when we talk about the continuum from general to specific we may often confuse the two distinct dimensions of uniqueness versus generality (a measure of base rates) and of specificity versus vagueness (a measure of interpretability). It is certainly possible for an item to be quite specific and yet still apply to the majority of the population (e.g. "You have two eyes, and two ears, but only one nose") or vague yet apply to relatively few (e.g. "You had a turbulent childhood"). It seems likely that items

which are general enough that they should be true of most people, and items which are simply true of most people[6] exploit different mechanisms to induce acceptance.

Similarly, triviality has been linked with non-uniqueness; Greene (1977) claims, for example that "though generalised interpretations may be accurate [they] are trivial, since they do not describe the student as being different from his/her classmates" (p. 965), and he measures triviality via the question 'Does this interpretation describe you as an unique person?'. But this need not follow; some generally true information can be extremely important or profound (e.g. "you take your partner too much for granted."), whereas specific information can be quite trivial, even when true (e.g. "you are interested in genealogy").

Notwithstanding these cases, there has been relatively little effort made to explicitly evaluate the effects of statement characteristics relative to one another, although there is some indication that they do interact. Snyder & Shenkel (1976), for example, report that manipulating favourability affects base rates, and Snyder et al. (1977) have argued that this compromises research on favourability which does not similarly consider base rates. Greene et al. (1980) similarly found sketches of high and low generality to differ in their social desirability (favourability), and Collins et al. (1977) have described how difficult it can be to tease apart the effects of these two factors, which were highly correlated in their study. Snyder & Shenkel (1976) also found that favourability affected self-other asymmetry, with unfavourable items being regarded as equally applicable to others (although no significant interaction

was found between person rated and statement valence). The relative influence of statement characteristics upon Barnum acceptance, and the interdependence of those properties needs to be investigated more directly if we are to successfully characterise Barnum statements.

6.1.4 Acceptance of statements

Although they typically can be ascribed to one or more of the categories outlined above, in practice Barnum statements are often defined operationally - in terms of the general levels of acceptance they elicit - rather than by reference to particular characteristics they may possess. For example, Forer (1949) and Weisberg (1970) assume that a non-rectangular distribution of acceptance ratings across the range of possible responses constitutes an endorsement of the effect.

Surprisingly, in the course of attempting to characterise the pool of Barnum statements, researchers have overlooked the fact that some of the items do not actually produce the expected acceptance rates, and have not done so from the very outset. In Forer's (1949) seminal study, more than half the respondents did not accept statements 5 ("Your sexual adjustment has caused problems for you") and 12 ("Some of your aspirations tend to be pretty unrealistic") as revealing characteristics of their personality. These two rogue items also performed poorly in Stagner's (1958) replication with at least 50% of respondents rating them either 'more wrong than right' or 'almost entirely wrong'. Where more recent individual statement means are available (Johnson et al., 1985), it seems that they still perform relatively poorly.

Baucom & Greene (1979) found the rogue statements 5 and 12 to be rated by only 28% and 36% respectively as true of themselves and rated as true of only 42% and 50% of others. Further, they actually identify 5 of the 12 classic statements as not being universally valid according to the relatively liberal criterion of applying to two thirds of the respondents. These findings tend to suggest that statements have been retained as archetypal Barnum statements without much consideration of their individual properties, which may cast some doubt upon the validity of any subsequent attempts to characterise them.

6.1.5 Aims of the present study

The present study was designed to demonstrate that some oft-used items drawn from Forer (1949) do not qualify as Barnum statements, as they are not accepted as true by subjects, and to replicate reported differences between ratings of applicability to self versus applicability to others. It was also intended to adopt factor analysis[7] to evaluate the relative strength of relationship between the acceptance of Barnum statements and their possession of properties previously described as characteristic of this statement pool, paying particular attention to interdependence among properties.

Given the exploratory nature of the study, only two formal hypotheses were framed:

H_1 : That the two rogue items which have fared poorly in the past will again be rated by subjects as less accurate than the other items in the pool.

H_2 : That all statements will be regarded as more accurate with respect to self than to others.

6.2 Method (i): Acceptance data

6.2.1 Subjects

Eighty-nine Psychology undergraduates at the University of Hertfordshire (58 female, 31 male; in the age range 19 - 46, with a mode of 20) participated as part of their course requirement.

6.2.2 Materials

The sham personality measure was the standard form of the Myers Briggs Type Indicator (Myers & McCaulley, 1989). Thirty Barnum statements were drawn from Forer (1949), Paterson (reproduced in Marks & Seeman, 1962), and Sundberg (1955). All statements were presented in the second person. This list of 30 statements was considered to be too long to be convincing as feedback from the personality test, so items were randomly[8] allocated to one of three subgroups of 10 items. Each S received feedback made up of two of the three subgroups (i.e. 20 statements).

6.2.3 Procedure

As part of their undergraduate course in psychology at the University of Hertfordshire, subjects were given the Myers Briggs personality measure. At the subsequent practical class, seven days later, they were provided with a personality sketch, ostensibly as feedback from the inventory. The sketch appeared as a type-written, numbered list of twenty items. Attached to their feedback was a rating sheet which gave the instruction:

> On the following pages you will find the personality description which was generated for you on the basis of your answers on the personality measure. To standardise our evaluation across subjects (i.e. to make sure each person's judgement carries equal weight) your feedback is limited to the twenty descriptions which were felt to best describe your personality. They are given as discrete and numbered statements because they may be based on different questions or different interpretations of the same questions. We want you to rate each statement separately, according to how well you think the description applies to you, so that we can get a clearer picture of which interpretations are successful and which not.

Ratings were given using a 5-point Likert scale after Carrier (1963), where 1 = almost entirely wrong, 2 = more wrong than right, 3 = about half and half, 4 = rather good, 5 = amazingly accurate. Once subjects had completed the self-evaluation, they were given a second rating sheet with the instructions:

> It is useful, when assessing new interpretative techniques, for us to determine the degree to which you think that the interpretation accurately describes your personality. However, we need to be sure that if you rate a statement highly it is not because the item would be generally true of most people, but rather because it tells us something interesting about you specifically. In order to get some measure of how discriminating our interpretations are, we would like you to give each item a rating according to the degree to which you think the statement could be generally true of most people.

Ratings were given for the same statement set, using a 5-point Likert scale, where 1 = definitely general, 2 = fairly general, 3 = unsure, 4 = fairly specific to me, 5 = definitely specific to me. Subjects were thoroughly debriefed as to the true purpose of the study on completion of this second measure.

6.3 Results (i)

6.3.1 Description of statement characteristics

To test whether the rogue statements still under-perform relative to other Barnum statements, subjects' ratings for these items were compared with ratings for other

items in the subset. Subjects ratings for rogue statements and other subset items (controls) are summarised in Figure 6.1.

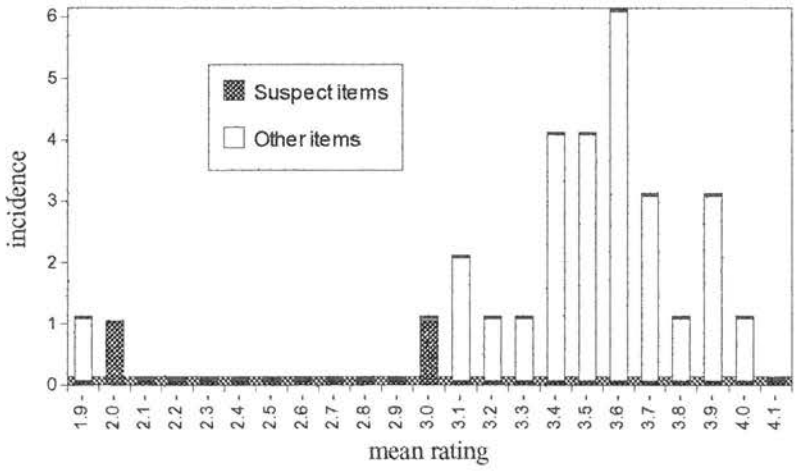


Figure 6.1: Distribution of statement mean ratings

It can be seen that rogue items[9] underperform relative to controls, and are only given a mean rating at or below the midpoint of 2.5. Indeed, within group comparisons of statement performance shows that Forer's statement 5 ('Your sexual adjustment has caused problems for you') was given a significantly lower acceptance rating than the mean for the subset of items with which it was presented [W = 166, n = 65, p< .0001] and that Forer's Statement 12 ('Some of your aspirations tend to be pretty unrealistic') similarly achieved a significantly lower acceptance rating than the mean for its subset [W = 301.5, n = 52, p < .0004].

Interestingly, one of the items in the third subset ("You like sports and athletic events but devote more of your attention to reading about them in the sporting pages than in actual participation") also presents as an outlier, in that it was found post hoc to differ significantly from the mean rating for the third subset [W = 134, n = 61, p < .0001].

6.3.2 Ratings of general applicability

Although acceptance was high, subjects were aware that the statements could be applied generally, in contradiction to H_2. The mean generality rating of 2.76 (standard deviation 0.29) is significantly below the midpoint of 3 [W = 7, n = 30, p = .0004]. However, when we compare individual statement ratings of applicability to self and to others, there is surprisingly a *positive* correlation, indicating that those items that were most highly accepted as true of the respondent tended to be those which were regarded as least general, although this trend was not significant [*post hoc* r_s = .2421, p = .197, two tailed]. Similarly, those Ss who rated the sketch as applicable to them were least likely to regard it as generally true [*post hoc* r_s = .424, p < .0001, two tailed].

6.4 Discussion

As predicted, the rogue items again fail to induce acceptance to the same degree as Barnum statements generally. This replicates Forer's (1949) original finding and similar effects reported by Baucom & Greene (1979), and evident in Stagner (1958)

and Johnson et al. (1985). We can thus have little confidence in these items as qualifying as Barnum statements, and must be wary of their inclusion in Barnum studies.

Interestingly, a third item also presents as an outlier, and is only moderately accepted. It is unfortunate that we do not have comparable acceptance ratings for this item from Marks & Seeman (1962), since poor acceptance here could conceivably reflect social change or differences in the subject population; sports facilities are readily available at the University of Edinburgh and students are actively encouraged to engage in some form of sporting activity.

We failed to find a self-other distinction as predicted by H_2, in that Ss were able in this context to recognise that the statements could be applied generally. This failure may be an artifact of the question format, since we adopted Greene's notion of 'uniqueness' (Greene, 1977; Harris & Greene, 1984), so that this result may be regarded as a replication of these studies. We should note that there was still the potential here for any self-other measure to be affected somewhat by an order effect, since all subjects rated for self before rating for other. Given the context of presentation of the feedback this was unavoidable, but we should be aware that it may have had consequences for subjects evaluations, since they are not coming 'cold' to the evaluations of applicability to others.

Support for an interpretation in terms of artifact comes from the curious finding that those items which were better accepted as true of the respondent tended to be simultaneously considered least general (a trend which was highly significant for the between subjects measure). In this respect we *do* reproduce the general finding that where respondents accept a description as true for themselves they fail to appreciate that it would be equally true for others (Snyder & Shenkel, 1976; Ziv & Nevenhaus, 1972). The self-other relationship could conceivably be a consequence of specific properties of some subset of statements, for example item favourability or externality. Study 2 was designed to explore the interrelationship of properties, and to determine which of those properties is associated with item acceptance.

6.5 Method (ii) statement properties

6.5.1 Subjects

Forty-eight psychology undergraduates at the University of Edinburgh volunteered to act as judges of the statement properties. Participants consisted of 17 males and 31 females, with a mean age of 22.4 years (range 17 - 36).

6.5.2 Materials

The statement pool of 30 items[10] was expanded to include 45 further items used in Chapter 4 for which acceptance data was already available. These were similarly presented in the second person. Eight properties were identified for consideration as factors influencing statement acceptance. These were chosen by the authors on the

basis of previous work in the literature (as described in the introduction), and are listed in Table 6.1:

	label	description
J1:	uniqueness	The degree to which a statement says something which is unique or particular to the individual concerned (as opposed to statements which would be generally true).
J2:	favourability	The degree to which a statement represents a favourable description of the individual concerned.
J3:	specificity	The degree to which a statement describes the individual in specific ways (as opposed to vague or ambiguous statements).
J4:	non-triviality	The degree to which a statement represents something which is important or fundamental about the individual concerned (as opposed to trivial or superficial comments).
J5:	externality	The degree to which a statement describes aspects of the person which are accessible to others (as opposed to aspects which are accessible only to the individual themselves).
J6:	not-structure	The degree to which a statement is true by virtue of its content, as opposed to being bound to be true because of its structure or the way it is phrased (intended to tap double-headedness).
J7:	useful/self	The degree to which a statement provides information which would be useful to the individual concerned in helping them to better understand themselves.
J8:	useful/other	The degree to which a statement provides information which would be useful to others in helping them to better understand the individual concerned.

Table 6.1: Statement properties to be assessed

6.5.3 Procedure

On recruitment, judges were informed that the study was concerned with establishing which properties of statements have an influence upon the likelihood that they are accepted as true by a target person. They were given a list of 75 statements which, it was explained, had previously been used to describe or make predictions about people's personalities. Six judges were allocated randomly to each of 8 conditions,

with each assessing only one property by evaluating the degree to which each statement exhibited the given property. Judgements were made using a 5-point Likert scale[11]. Judges were free to take the sheet away to complete at home, but were required to work individually.

6.6 Results (ii)

A mean rating was calculated for each statement for each property. Interdependence between properties and their covariance with acceptance was explored in the first instance by generating a correlation matrix, reproduced as Table 6.2.

	accept -ance	Unique ness	Favoura -bility	Specifi city	non Triviality	Extern ality	non Structure	Useful / self	Useful / other
Acceptance	1.000								
Uniqueness	-0.254[c]	1.000							
Favourability	0.482[a]	-0.300[c]	1.000						
Specificity	-0.134	0.373[b]	0.004	1.000					
non Triviality	0.249[c]	0.207	0.205	0.301[c]	1				
Externality	0.229	0.309[b]	0.263[c]	0.201	-0.199	1.000			
non Structure	-0.379[b]	0.167	0.027	0.339[b]	0.140	0.082	1.000		
Useful / self	0.157	0.177	-0.182	0.006	0.486[a]	-0.337[b]	-0.137	1.000	
Useful / other	0.104	0.186	0.143	0.265[c]	0.538[a]	-0.069	0.272[c]	0.327[b]	1.000

Table 6.2: Correlation matrix for statement properties

[a] $p < .001$, [b] $p < .01$, [c] $p < .05$

From Table 6.2 it can be seen that although a number of the properties considered here are able to predict subsequent acceptance to a significant degree, they are not independent of one another. Significant relationships exist between a number of properties. Although some of these are to be expected (for example, among the three utility scales), others suggest a more complicated inter-relationship. The high interdependence makes a planned multiple regression analysis impracticable, since such coefficients can tend to underestimate the relationship between factors and the criterion in situations where the factors are not independent of each other[12].

It is more appropriate to factor analyse the property ratings to determine the true number of independent factors. Using Principal components analysis with Varimax rotation ensures that factors thus identified are orthogonal which is a desirable characteristic for data for multiple regression. Three factors were identified using the Kaiser-1 criterion, and factor loadings for these are given in Table 6.3:

	Factor 1 [utility]	Factor 2 [structure]	Factor 3 [classic]
Eigenvalue	2.348	1.683	1.356
% variance	29.400	21.0	17.0
UNIQUE	0.176	0.469	**-0.670**
FAVOURABLE	0.233	0.002	**0.809**
SPECIFIC	0.157	**0.808**	-0.040
NON_TRIVIAL	**0.865**	0.189	0.046
EXTERNAL	-0.342	0.304	**0.640**
NON_STRUCTURE	0.030	**0.731**	0.048
USEFUL_SELF	**0.726**	-0.242	-0.343
USEFUL_OTHER	**0.728**	0.337	0.103

Table 6.3: Factor analysis of property ratings

The Kaiser-1 criterion has been criticised as being too liberal (see, e.g., Lawrence, 1994) and that scree plot analysis is to be preferred (Zwick & Velicer, 1986). A scree slope analysis consists of initially plotting eigenvalues in order of size for all measurable factors[13]. A visually judged line of best fit is fitted through the smallest eigenvalues and only those which fall above this line are treated as meaningful. In this case, there is a very distinct differentiation between factors 3 and 4 - so much so that it was not felt necessary to superimpose the scree slope here to lead the reader to the same conclusion. It is reassuring to note that this approach offers the same solution as suggested by Kaiser-1 (see Figure 6.2). The analysis (see table 6.3) suggests a very clear factor structure, with all variables loading high (>.6) on one of the three factors, but with no variable loading high on more than one factor.

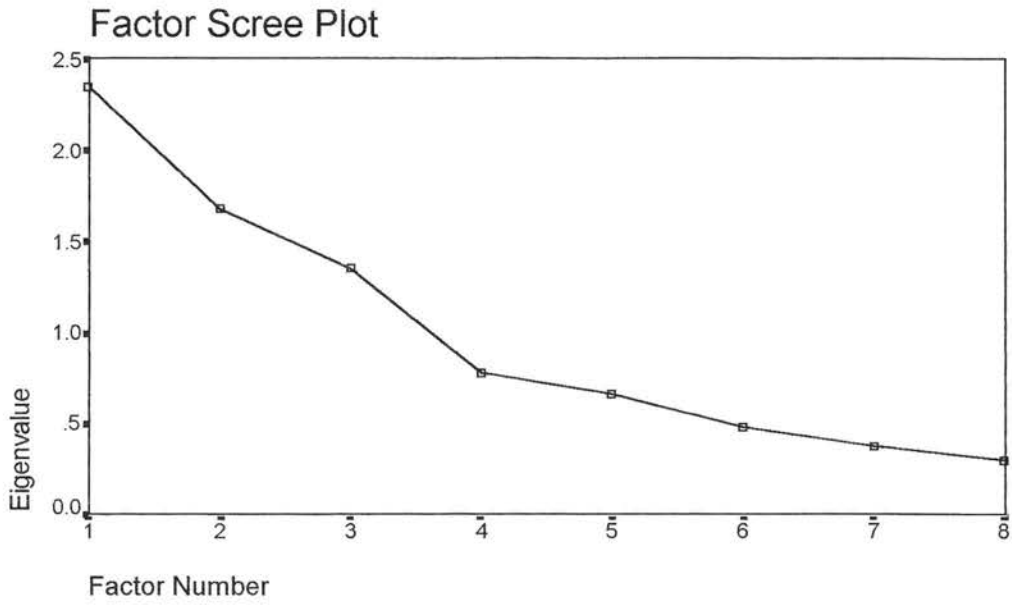


Figure 6.2: Scree plot of Eigenvalues of factors

The three factors jointly accounted for 67.4% of the variance. The first factor, accounting for 29.4% of the variance, was labelled 'utility' since the variables which loaded on it consisted of non-triviality and usefulness to self and to others. Given the conceptual similarity of these variables, this factor was expected. The second factor, accounting for 21% of the variance, contained the variables specificity (a measure of vagueness) and non-structure (a measure of double-headedness), and so was identified as a 'structure' factor. The third factor accounted for 17% of the variance. It contained the variables of uniqueness (generality), favourability and externality (superficiality) and so was considered to capture the classical characteristics of Barnum statements.

We can assess the relative contributions of these factors in inducing acceptance by using the three sets of factor scores for each statement as source data for a multiple regression upon acceptance[14]. The results of this analysis are given in table 6.4.

	co-efficient	std error	t value	prob
Intercept	3.657			
Factor 1 (Utility)	0.159	0.051	3.151	0.002
Factor 2 (Structure)	-0.159	0.051	-3.141	0.003
Factor 3 (Classic)	0.246	0.051	4.870	>>.001

Table 6.4: Beta coefficient table for multiple regression of statement properties against acceptance

In using this battery of predictors, we can predict acceptance scores at better than chance levels [$F = 14.50$, $p < .0001$][15]. The composite made up of the three factors can account for 38.0 % of the variance, which is superior to the performance of any single factor from the battery, with the strongest relationship (with the classic factor) accounting for 20.7% of the variance. Although factor 3 clearly displays the strongest association, the independent contributions of all three of the regression coefficients are highly significant, suggesting that all are good predictors of acceptance.

6.7 Discussion

The study has demonstrated that many of the properties considered in the Barnum literature are strongly interdependent, at least with respect to the statement pool currently used. Some of these observed associations are somewhat trivial (for example, among the utility items), but others suggest a rather complex picture. Among these is the correlation between favourability and base rates (as measured here under 'uniqueness'), which replicates the findings of others (Collins et al., 1977; Greene et al., 1980; Snyder & Shenkel, 1976). We should note, however, that this is one of the weaker associations, and no correction has been made for multiple analyses. Nevertheless, we echo Snyder et al's (1977) concern about considering variables in isolation. It is difficult to conceive of how properties can be effectively manipulated while keeping other properties constant.

Among other relationships found here, traits which were regarded as unique to the individual concerned were more likely to be internal (that is, relatively inaccessible to observers other than the individual themselves), and to describe the respondent in relatively specific ways (although it should be noted that these two variables only have 13.9% of their variance in common). Internal traits were rated as providing more useful information for the respondent (who presumably has access to the information anyway), but surprisingly not more information to others (who would not normally have such access). Favourable items tended to refer to aspects of the individual which are observable by others. Insofar as a self-other distinction can be accounted for either in terms of a positivity bias (Taylor & Brown, 1986) or a

consequence of the accessibility of traits (Funder, 1980), these effects seem likely to act in opposition to one another.

The interrelations between properties gave rise to a very clear factor structure which identified three factors. The first of these addressed the utility of information given in Barnum statements, the second captured structural attributes of statements including vagueness and double-headedness, whereas the third represented the classical Barnum attributes of favourability, superficiality and generality (base rates). It is perhaps disappointing that these latter properties cannot be teased apart to allow us to determine their relative contribution to the Barnum effect. However, we can note that generality (base rates) and generality (vagueness) actually load onto different factors, and so do represent distinct variables. This supports the notion that some 'general' items may be successful because they have high base-rate accuracy whereas others are sufficiently vague to be regarded as true of the respondent. It may not be surprising, then, that only a proportion of all Barnum statements actually have high base-rates (Baucom & Greene, 1979). It also warns that greater care needs to be taken when defining the aspect of generality under investigation in any particular context. Triviality and uniqueness similarly load on different factors, so we are not justified in treating these as synonymous, as suggested by Greene (1977), and indeed there is likely to be no sweeping generalisation that can be applied to characterise all Barnum statements.

This interpretation is supported by the regression of factors upon acceptance for Barnum items. Although the classical Barnum factor provided the best predictor of acceptance, it is particularly interesting to find that all three factors were significantly related to acceptance. We can recommend, then, that to be readily accepted, statements should be worded such that the item is bound to be true (e.g. by being sufficiently vague or double-headed), should make reference to trivial attributes of the respondent, and be oriented so that the statement is regarded as favourable and generally applicable. Taken together, the 3-factor solution summarising independent ratings of statement properties was able to account for a significant proportion of the variance in item acceptance. This strongly suggests that the Barnum effect is at least partly due to attributes inherent in the statements themselves.

It should be noted that the study is still restricted in how we can meaningfully interpret 'acceptance'. All relationships described here are with simple acceptance as true. It was not possible within the scope of this study to further explore what respondents make of the feedback (some of the acceptance data was already collected from earlier studies, for example). It would be informative to conduct a follow-up study in which subjects are asked to make a range of assessments (as in Harris & Greene, 1984; Schroeder & Lesyk, 1976) rather than to simply accept or reject an item.

6.8 Chapter summary

This chapter criticised accounts of the success of pseudopsychic readings simply in terms of the Barnum Effect as unsatisfactory, since they fail to explain why such an effect should occur at all. Two studies are described which bear upon the suggestion that acceptance may be due, at least in part, to properties inherentin the statements themselves. Previous literature which provides characterisations of Barnum statements is reviewed and criticised on the grounds that the properties under investigation have not been clearly defined, and that little attention has been paid to interrelationships between properties.

Study 1 replicated the generally unappreciated finding that some Barnum items do not induce acceptance and it was recommended that these rogue items were not used in future Barnum studies. It was found that Ss could recognise that statements were generally true rather than capturing some trait that was particular to them. However, it was also found that those sketches which were best accepted were regarded as least generalisable, suggesting a self-other distinction. Study 2 explored the properties of statements which may be influential in item acceptance. It was found that, as expected, statement properties cannot be regarded as independent of one another, at least with respect to the statement pool used here. Statement intercorrelations gave rise to a clear 3-factor structure, with all three factors predicting item acceptance to a significant degree. This was interpreted as supporting the claim that Barnum acceptance is to some degree a function of properties inherent in the statements themselves.

[1] I should like to thank Richard Wiseman for conducting the Hertfordshire element of this study. A version of this paper has been submitted for publication as a co-authored paper. However, this chapter has been written (and data analysed) independently of Wiseman.

[2] Snyder et al. (1977) attribute the term to Thorne (1961).

[3] This does seem to be an unduly pessimistic view of the validity of psychometric methods, as it seems to imply that feedback will only be as accurate as allowed by chance and the natural incidence within the population of the trait in question. Although narrower in applicability if presented to people in general, actual feedback is of course derived from individual subject's responses and would be expected to be more accurate than simple chance coincidence. A parallel may be drawn with cold and warm reading (see Roe, 1991); the former is designed to be reasonably accurate for the majority of people, the latter is tailored by subjects' responses to give less general descriptions which nevertheless are applicable in this particular case.

[4] Of the six items that did not give rise to significant differences, all were in the predicted direction and four gave t values greater than 1.7, generating reasonable effect sizes (Cohen's $d >= 0.25$). With a more powerful study (i.e. $n > 93$) these four may have produced effects that achieved significance by conventional criteria.

[5] It is as yet unclear how this view can be reconciled with respondents' spontaneous comments to their feedback, which strongly suggests that they were not aware of this triviality (see e.g. Lattal & Lattal, 1967; Stachnik & Stachnik, 1980; Ulrich et al., 1963).

[6] These latter have been described elsewhere (Couttie, 1988; Roe, 1991) as specific generalisations.

[7] One previous Barnum study to use factor analysis is Furnham & Varian (1988), but this was only concerned with confirming their a priori allocation of statements to one of four (2 x 2 for favourability and generality) categories, and was performed on acceptance ratings rather than upon ratings of the presence of the properties themselves,

[8] Using random number tables (RAND, 1955).

[9] Represented here as types 1 and 3 (to overcome idiosynchrasies in the graphing facility of SPSS). Note also type 5, identified post hoc as an outlier.

[10] The rogue items were retained here as they are traditionally regarded as Barnum statements. Since we are looking for statement properties that covary with acceptance, their inclusion was not thought to be problematic, and indeed may serve to broaden variance.

[11] The scale labels depended on the dimension being judged, but took the general form of 1 = definitely x, 2 = fairly x, 3 = neutral, 4 = fairly *un*-x, 5 = definitely *un* -x.

[12] As Howell (1987: 482) notes; "It is important to recognise that a test on a variable is done in the context of all other variables in the equation. A variable might have a very high individual correlation with the criterion, but have nothing useful to contribute once several other variables are included".

[13] The usual determinant of the number of *initial* factors is that it cannot exceed the number of variables to be summarised, and typically equals this number.

[14] Note that although factors may not be orthogonal in reality, pragmatically it makes sense to treat them as such.

[15] Factor loadings can be used as independent variables in a multiple linear regression, where the factor loadings represent the weighting of scores on each variable so that the sum provides an estimate of the criterion variable.

Chapter 7: The Barnum Effect in Clients' Evaluations of a Tarot Reading

7.1 Introduction

7.1.1 Introduction

Donald G. Paterson is credited (in Meehl, 1956) with coining the term Barnum effect when warning clinicians against the growing use of "personality descriptions after the manner of P.T. Barnum" as part of diagnostic feedback. The allusion is to Phineas Barnum, an American showman of the 19th century who is alleged to have attributed the popularity of his circus to there being "a little something for everybody" (referred to in Snyder et al, 1977), a comment which may also apply to Barnum statements themselves. Indeed, we have seen in the previous chapter that Barnum acceptance can be accounted for in part in terms of properties of the statements themselves. However, less kindly, the choice of term may be a reference to Barnum's claim that "There's a sucker born every minute" (OUP, 1985; French et al., 1991 offer such an interpretation).

Research into the nature and causes of this phenomenon has recognised that a number of disparate factors may be at work in inducing Barnum acceptance. This work can reasonably be regarded as concentrating on three broad factors:

characteristics of the feedback items, characteristics of the subject, and characteristics of the context within which feedback is given. Underpinning all this work, however, is the assumption (made explicitly or implicitly) that Ss accept general feedback at face value as uniquely accurate, apparently unaware that the description could apply equally well to others. Only if this is the case does it become reasonable to account for Ss naivete solely in terms of trait or situational factors. This work is very briefly reviewed in the following sections:

7.1.2 Characteristics of the feedback items

In an earlier study, we saw that it may be possible to predict with some accuracy the rate of acceptance of Barnum statements purely on the basis of independent judges' assessments of statement properties (see Sections 6.6 and 6.7). Indeed many studies have demonstrated that greater acceptance of a sketch can be induced when the statements themselves are general (e.g. Carrier, 1963; Snyder, 1974b) even to the extent of preferring a 'fake' generalised interpretation over one actually derived from their personality tests (Merrens & Richards, 1970). Similar effects have been achieved through manipulating statement favourability (e.g. Collins et al, 1977) and base-rate accuracy (e.g. Snyder & Shenkel, 1976). Taken together, these strongly suggest that Barnum acceptance is at least in part a consequence of properties inherent in the statements themselves.

7.1.3 Characteristics of the subject

From the earliest studies of the phenomenon, susceptibility to the Barnum effect has been portrayed as an expression of some generally-defined, negatively-oriented personality dimension akin to gullibility. Forer's (1949) original investigation was alternatively titled "a Classroom Demonstration of Gullibility", and this characterisation has been easily adopted by others (e.g. Lattal & Lattal, 1967). Persistent attempts have been made to identify personality correlates of acceptance which could conceivably reflect a general gullibility trait. For example, Carrier (1963) investigated whether certain need-states mediated acceptance in the Barnum context. Using the Edwards Personal Preference Schedule, he found some measures which covaried significantly with acceptance, although the correlations were relatively weak (typically in the range .15 to .25), were not constant across the sexes[1], and made no correction for multiple analyses. Other personality variables which have been found to covary with acceptance include acquiescence (Mosher, 1965), neuroticism (Fichten & Sunerton, 1983), general anxiety (Weimann, 1982) and authoritarianism (Orpen & Jamotte, 1975), but without replication these relationships must be treated with some caution.

The more robust findings resulting from this search have characterised Barnum acceptors as high on social desirability (e.g. Mosher, 1965; Snyder & Larson, 1972), and as tending to the external on locus of control (e.g. Orpen & Jamotte, 1975; Snyder & Larson, 1972), although for both of these variables the effect sizes are small to medium (after Howell, 1987, p. 198).

It should also be noted that there has been opposition to this general view. Layne (1978, 1979; Layn & Ally, 1980) has probably been most vocal in this respect, and has argued that "The acceptance phenomenon is caused neither by a subpopulation of especially gullible people nor by a universal gullibility suffered by all people." (p. 219). In their literature review, Snyder et al. (1977) similarly concluded that the evidence did not provide support for a simple profile of the gullible subject. For example, younger and 'lower-status' (principally defined with reference to the stage of Ss' education) Ss were no more likely to be accepting than more sophisticated Ss.

7.1.4 Characteristics of the feedback context

Richards & Merrens (1971) varied the feedback context by having Ss complete different personality measures upon which feedback would ostensibly be based. They reported that Ss who completed an abbreviated Rorschach test subsequently rated their feedback more highly than others who believed the same feedback to be derived from their responses on Q & A measures. They account for these results in terms of the perceived ambiguity or 'mysteriousness' of the assessment measure: whereas objective tests could appear relatively transparent in their action, and thus easily faked by the S, these other measures are more difficult to understand, such that Ss feel less in control of the information they are revealing about themselves. Snyder (1974a) noted a similar trend in two studies in which Ss showed greater acceptance for feedback ostensibly based on assessment devices in the preferred order; projective technique, interview, objective test, "controlled comparison" (in which they were given a sketch claimed to be 'generally true of people'). In both

these studies, there is a potential confound in that differential acceptance may be related to the different degrees to which Ss were able to give spontaneous or 'self-generated' responses rather than having to pigeon-hole themselves by selecting one of a given set of alternatives; if the response measure is so-restricted the subject may not have high expectations of the subsequent diagnostic feedback. However, Snyder et al (1976) interestingly discovered that similarly high acceptance levels were elicited when the mysterious assessment device was a graphologically-based test or an astrologically-based test, for which the subjects' scope to contribute unique information may be more limited.

A second situational factor to be considered is the degree to which the protocol implies that the feedback given to Ss was derived *specifically* for them (termed *feedback relevance* by Snyder and Larson, 1972). Direct manipulation of feedback relevance, simply by telling Ss either that the personality interpretation was specifically derived for them or was generally true of people, caused greater acceptance when relevance was high (Snyder 1974a; Snyder et al., 1976; although Collins et al, 1977, failed to generate a significant effect, the trend here was also in the predicted direction).

When presented thus, the effect is undoubtedly trivial. However, Snyder & Shenkel (1975) considered the effects of relevance more indirectly, using the sham context of an astrological reading. As previously, some Ss were told that the feedback they had received was "generally true of most people", but others were told that the reading

was based on information they had given about the year and month of their birth, while a third group had been asked to also include information about the specific day of their birth. As predicted, the greater the level of specificity of information upon which the reading was ostensibly based, the greater the degree of acceptance of the subsequent feedback[2].

7.1.5 Characteristics of the psychic reading context

It is interesting to note that, on the basis of the findings noted above, the pseudopsychic reading situation could be regarded in a number of ways as approximating an 'ideal' Barnum context. With regard to so-called general gullibility, it has been suggested (e.g. Alcock, 1981, 1990) that believers in psi phenomena exhibit deficient reasoning skills compared with non-believers. This account has received some empirical support (Alcock & Otis, 1981; Gray & Mill, 1990; but see also Irwin, 1991 and Roe, 1995b). On the basis of survey data, Tyson (1982) has characterised clients who consult diviners (in this case astrologers) as being particularly stressful and / or having an external locus of control. Echoing Snyder & Shenkel (1975), Furnham & Varian (1988) have speculated (in the absence of supporting evidence) that

> It is possible that neurotics seek out feedback from professionals like astrologers, graphologists or psychotherapists [sic] which may well be bogus, so confirming the suspicion of many cynics that it is often the worried, depressed and unsure who visit fortune tellers and the like. (p. 745).

Pseudopsychics have long advocated using general and favourable statements during readings (e.g. Jones, 1989), and have even put forward Forer's (1949) thirteen

original items as crib material[3] (Earle, 1990a). We have already seen (chapter 5) that sample statements drawn from such sources have been shown to exhibit similar acceptance patterns to Barnum statements when presented using a conventional Barnum protocol.

The psychic reading offers an assessment device which is characteristically mysterious, since its method of action is typically described in terms of paranormal processes which are poorly understood (even by the initiate). Much of the ceremony associated with readings acts to reinforce the obscurity of the forces at work, and to emphasise the reader's privileged position as a vehicle for its expression. At the same time, however, the client usually plays a direct role in the divination process, heightening the relevance of the process to them; this may be as involved as using their own hand as the source of a palmistry reading through to merely shuffling a Tarot card deck prior to producing a spread of cards to be interpreted. As the client becomes personally involved in the rituals associated with generating the reading, it seems likely that the material so produced will take on the aspect of being uniquely pertinent to them.

7.1.6 Differences between the two contexts

Although the similarities between conditions which are considered conducive for generating the Barnum Effect, and those found in 'live' psychic readings are striking, they only represent circumstantial evidence, and there are grounds for suggesting that such a facile assumption may be mistaken. The method by which

pseudopsychics present material is quite different from that conventionally adopted in the Barnum literature; Barnum feedback is typically presented as a single body of text, so that the subject is able to view the sketch as a whole, whereas in psychic readings information is transmitted verbally and sequentially, conferring different properties upon the communication and making different demands upon the recipient[4]. Snyder & Shenkel (1976) have noted the general finding that where a persuasive communication is presented in oral and written form, the oral version has more persuasive impact, and thus that we might expect a similar effect in Barnum presentations. However, only two studies have presented the Barnum sketch orally, and both of these have limitations so that this issue has not yet been satisfactorily resolved: Mosher (1965) did not include a written version for comparison and so is difficult to interpret; Snyder & Shenkel (1976) found that communication modality had no effect upon acceptance, but the assessment measure was rather crude, consisting of a single 5-point question. Two attributes of oral presentations are considered in more detail here: the indexicality of spoken language, and the greater reliance upon memorial representation of the material.

It has been claimed that the vast majority of expressions normally used in conversation are indexical, that is, the meaning of the expression alters with the context of use (e.g. Barnes & Law, 1976)[5, 6]. Such verbal communications require a more active role on the part of the listener. Instead of meaning being inherent in the message itself, the listener must decide which of the multiplicity of possible meanings will be most in accord with that intended by the speaker. The choice is

influenced by the way the listener interprets the environment in which the message is uttered, who the speaker is, what their status is, what they have said previously, what is likely to happen next and so on (see, e.g., Potter & Wetherell, 1987). In normal dialogue, where there is a genuine attempt to communicate, and the number of plausible alternative interpretations is severely constrained by the context, this process can run quite seamlessly, as the listener's adopted meaning approximates that intended by the speaker. But even here misapprehensions are possible, as evidenced by attempts to 'repair' dissonances in meaning as a dialogue progresses (see, e.g., Jefferson, 1987).

In the pseudopsychic communication, however, this usual relationship may be exploited by the use of statements which would not be regarded as a genuine attempt to communicate any specific information known to the speaker. Rather, the utterances are chosen because they are sufficiently free of meaning to encourage the listener to impose one of their own[7]. The listener, guided by the assumption that the speaker is speaking to and about them and thus that what is communicated should in some way be personally relevant, is motivated to interpret the message in terms of their own personality, circumstances and experiences. This elaborated meaning is mistakenly assumed to approximate that intended by the reader. As Hyman (1989a) notes:

> Humans are social animals par excellence. We are primed for picking up meaning in both the gestures and words of our fellow animals. We are so good at this, in fact, that we pick up meaning even where none was intended. The psychic reader capitalizes on this tendency. The client receives a meaningful reading without realizing that he or she has put all the meaning into the reading ...
>
> It is probably a tribute to the creativity of the human mind that a client can, under the right circumstances, make sense out of almost any reading and manage to fit it to his or her

> own unique situation. All that is necessary is that the reader make out a plausible case for why the reading ought to fit. The client will do the rest. (p. 400-406).[8]

Clients can be encouraged to work harder than usual to decipher messages, as the reader feigns difficulty in understanding a received communication or particular omen, or claims to "only see pieces, as in a jigsaw puzzle" which only the client could truly understand (Earle, 1990a, p.6). When taken to extremes, the communication can be little more than nonsense, as the reader makes liberal use of symbolism, metaphor or mystical jargon safe in the knowledge that the client will be striving to make sense of it all. They may even "remember" information which was never actually part of their reading, but was evoked in some way by the process of interpreting the given material (for example, see the illustration derived from Randi [1981] given in section 4.4.3). As a result, clients may evaluate the reading not on the basis of what was actually said, but with reference to their processed version of the raw stimulus; a version which has been interpreted, elaborated, personalised, such that it should not be surprising that the reading is seen as impressive. Further, if the client has a particular need or belief system which causes them to be especially motivated to make sense of the communication - for example, if they have recently lost a relative and need to believe that the person has survived in some form and is able to maintain contact with them - then this process can become increasingly successful.

The dynamic and transitory nature of a message presented in real-time places greater demands on cognitive resources. The listener must depend upon memory as the only

record of the reading, while the complexity of the interaction encourages the organisation of incoming information into forms which are less costly in terms of processing. It has been suggested that individuals make use of conceptual frameworks or schemata to impose meaning upon putatively meaningful material in other contexts (e.g. Bransford & Johnson, 1972; Pichert & Anderson, 1977). This process tends to prioritise incoming information according to how salient it is deemed by the schema that has been adopted, emphasising those aspects of the communication which accord with expectation, and de-emphasising those which do not. This process is very prone to incorporating distortions, especially in recall, in a manner which serves to make the whole more coherent and meaningful for the client (see e.g. Loftus, 1979)[9].

Pseudopsychics are aware that Ss come with particular expectations of their reading (Jones, 1989), especially in having problems they want the reader to resolve or questions they want to have answered - even one-off "sensation seeking" clients who have no pressing concern will select some aspect of their life which they would expect to be mentioned if the reader were truly psychic - and that these will tend to bias their interpretation of the reading so that it bears upon them rather than other issues. The reconstructive nature of memory is similarly exploited by recommending that readers not be afraid of feeding clients with possibly contradictory information during the course of a reading, in the knowledge that they will only attend to and subsequently recall what was true of them and safely forget the rest (Ruthchild, 1981).

7.1.7 The Barnum Effect: a reinterpretation

The above characterisation suggests a modified or expanded account of Barnum acceptance. The reading is successful not simply because it is accepted at face value as uniquely accurate, due to Ss' unsophisticated evaluation or because they are coerced by situational demands (although these play an important role). Rather, the reading is treated just like any other communication event, as Ss scan past experiences to find appropriate meanings for statements addressed to them; unconsciously elaborating on themes in uniquely personal ways, and subsequently evaluating the elaboration, not the reading itself. Thus the mechanism by which the Barnum effect acts may reflect an artifact of normally efficient cognitive processes concerned with making sense of communications from others, and may have more in common with other cognitive or processing biases (see, e.g., Nisbett & Ross, 1980) than has been previously thought.

It is also likely to have consequences for clients' recollection of their reading which would not be expected by the gullibility model, since this turns on the assumption that clients accept statements at face value. In particular, the cognitive processing artifact model predicts that Ss will better recall accepted information than rejected information, since the former has been successfully elaborated on and become associated with existing memory traces facilitating subsequent recall. It further suggests that for the subset of material recalled, the greatest degree of distortion will be associated with that material which was most strongly accepted and which was

thus most readily assimilated into existing schema (which by their nature modify the message to increase the fitness).

7.1.8 Characteristics of the present study

The present study is a preliminary attempt to assess whether the Barnum Effect is especially influential in the psychic reading context, by presenting Barnum statements as feedback in a simulated psychic reading. The intention is to retain those aspects of the reading context which emphasise the process's mysteriousness and relevance, as well as those which emphasise the normally transitory nature of such communications. The study is intended to evaluate the relative contribution of the gullibility hypothesis and the cognitive processing artifact hypothesis. It considers some of the personality factors (namely locus of control and need for approval) claimed by the former to covary with acceptance. It also investigates the relationship between Ss' initial acceptance of elements of the reading and their subsequent recall, which would be predicted by the latter characterisation. Thus it is predicted that:

H_1 : General acceptance will be high, and in the range of previous Barnum research.

H_2 : Acceptance level will vary according to statement favourability, with items from the favourable group being more highly rated than neutral items, who in turn will be preferred to unfavourable items.

H_3 : Ss' overall acceptance ratings will increase as their locus of control scores tend to the external.

H_4 : Ss' overall acceptance ratings will increase as their scores on a measure of social desirability increase.

H_5 : Gross recall on a surprise test will be better for those statements that achieved a high initial acceptance than for those that were poorly accepted.

H_6 : Of those statements that are recalled, there will be a negative correlation between degree of acceptance and degree of verbatim accuracy of that recall.

7.2 Method

7.2.1 Apparatus / Materials

7.2.1.1 The initial statement pool

Barnum statements were drawn from those previously used in the literature[10]. From this pool, 15 statements were selected on the basis of their performance in a pre-study[11]. This was intended to provide criteria for selecting statements such that the sketch produced would be relatively well-accepted as a whole (thus maintaining the link with previous Barnum work) but which would generate some variability in acceptance levels across items. The cognitive processing artifact model makes predictions which are only observable where there is such a range of acceptance across statements, since it is in relation to differences in acceptance that corresponding differences can be identified in the way in which items are processed (and ultimately recalled). Variability in item acceptance can most easily be induced by manipulating the perceived favourability of feedback (see, e.g., Weinberger & Bradley, 1980; see also Section 6.1.2.1).

7.2.1.2 Selection of reading statements: the pre-study

A pre-study was conducted in order to generate acceptance data to serve as a criterion for selecting items for use in the study proper. Forty-eight pupils of Trinity Academy secondary school (aged 15-17) were given an introductory lecture on astrology, and were then asked to participate in a test of one particular astrological prediction.

Character descriptions were provided for each of the 12 sun signs. The students were told that the more well-known traits (such as 'Taureans are Bullish') had been removed because they were likely to have seen such a descriptor in newspaper horoscopes. This left a list of the fifteen most typical descriptors which were claimed to typify that sign. In fact the sketch consisted of 15 Barnum statements (drawn from Forer, 1949; Paterson, 1955; Sundberg, 1955) presented either in unmodified form (e.g. "You occasionally get depressed, but you couldn't be called moody") or as a negative variant (e.g. "You tend to get depressed and could even be described as moody"). The sketch for each sign consisted of an equal number of positive and negative statement versions, counterbalanced across signs.

Ss gave ratings of how well the description fitted them on a 7-point Likert scale where 1 = 'doesn't describe me at all' and 7 = 'fits me perfectly'. A copy of the template sketch, outlining the format of feedback, but containing all statement versions is provided as an appendix. Ss were debriefed immediately on completion of the task. The debrief emphasised that statement acceptance did not reflect

gullibility on their part, but suggested that they might want to be more wary of reading too much into newspaper astrology readings in future. On the basis of Ss ratings, the five highest-rated positive and five lowest-rated negative statements were identified. Versions of the remaining five items were taken which gave ratings falling midway between the other two sets.

7.2.1.3 Supplementary reading elements

Ss were also to be given a subset of 5 statements based on loose interpretations of the cards[12] found in positions 1 through 5 of their spread, and which therefore would vary across subjects. These latter items were included primarily to lessen the deception (since some parts of the reading were indeed derived from their cards) and to provide the kinds of statements that Ss may particularly expect Tarot readers to produce. The list of Tarot interpretations used pseudopsychic statements (drawn from Cain, 1991; Hester & Hudson, 1977; Hobrin, 1990; and Webster, 1990) which echoed the predictions made for each card's appearance, as given in two "mainstream" Tarot guides (King, 1989; Sharman-Burke, 1985). A list of interpretations are given in the appendix. Card meanings were fixed in advance of the study, before knowing who would be acting as Ss.

7.2.1.4 Personality measures

Personality measures adopted here consisted of inventories of locus of control (Rotter, 1966), social desirability (Crowne & Marlowe, 1960), as well as a Belief in the Paranormal (BIP) scale. The BIP scale is an adapted version of Thalbourne &

Delin's (1993) Australian Scale, incorporating the changes in format described in Section 2.3.2). For present purposes, it also included items relating specifically to previous experience of and faith in Tarot as a divination tool to act as flags for confounding (experiential) variables. A copy of the scale is included as an appendix. Statements were presented to Ss via an RS232 interface link between two BBC model B microcomputers, programmed by the author in BASIC. Printouts of the two programs are included in the appendix.

7.2.2 Subjects

Sixteen first year psychology undergraduates (4 male, 12 female; mean age 21.9, mode 20) acted as subjects. The sample was chosen to minimise the likelihood that they had been exposed to the Barnum Effect through their studies, or that they had become suspicious of hidden agendas as a result of experiencing deception in other psychology class experiments.

7.2.3 Procedure

7.2.3.1 Recruitment

Students were approached during compulsory tutorials, and were asked to participate in "an evaluation of a Tarot Reading". A handout was supplied, which gave an overview of the major elements of the study and outlined the commitment entered into by Ss and by the experimenter (a copy is included as an appendix). Particular care was taken during the recruitment stage to ensure that Ss did not in any sense feel coerced into participating.[13] It was emphasised that they would not themselves be the

subjects of the study, but instead would be acting as independent judges helping us to evaluate a claim of psychic ability made by a third party. They would each provide the claimant with a Tarot card spread and assess the feedback that was derived from it in terms of how well it applied to them. Ss were asked to decide whether to participate only after they were confident that they understood what would be expected of them.

Upon recruitment, Ss were given the measures of social desirability, locus of control and belief in the paranormal. These were ostensibly to be used to provide a more "objective" measure against which to gauge the Tarot reading's content. Ss completed the questionnaires at home and returned them immediately prior to the reading. These inventories were collected from Ss prior to the reading. In the event of Ss not having completed them, the trial would have been postponed until such time as they had. Fortunately, this course of action was not necessary.

7.2.3.2 Generating a card spread

The study was organised in time blocks of 30 minutes duration arranged over a period of one week, with Ss selecting a slot when they would be available. The timetable format was designed to keep Ss apart immediately before and after their readings so that they could not discuss its content with one another (which could undermine the sham context), as well as to reinforce the impression that a claimant was giving up his or her own time to attend the department.

Ss were informed that to avoid any involuntary transfer of information (for example, via non-verbal communications) there could be no direct contact between them and the claimant. Instead, communication would take place via a computer link-up. Neither would they be able to meet directly after the reading, as this would constitute trial-by-trial feedback for the reader, which could act as a form of reinforcer. In actuality, the procedure was designed thus to disguise the fact that there was no 'reader' at all, but rather it was the experimenter (E) who would be transmitting the reading. Ss were housed in a cubicle containing a chair, and a table supporting a BBC micro computer. A Cable exiting from the computer led up through a false ceiling. Ss were told that this connected to the reader's terminal in a similar cubicle elsewhere in the building. It was emphasised that there were many such cubicles in the department, and that they could be physically quite far removed without affecting the communication link.

Ss were primed to expect personality-based information by being told that the reader had been instructed to concentrate on information which was instantly verifiable by the client. They were then introduced to an old-style and slightly worn Tarot deck which would be used to produce the card spread.[14] Written instructions were provided which detailed how to generate the Grand Cross arrangement (after King, 1989; a copy of the instruction set is included in the appendix), although E was present to ensure that the procedure was followed accurately. Cards were placed face down and without looking at them[15] on a 24" x 18" green baize-covered 'portable table'. Once the arrangement was complete, the experimenter removed the table

along with unused cards, ostensibly to transport them to the reader. Upon the experimenter's departure, S would sit at the terminal and wait for the reader to interpret the arrangement and start to relay any impressions formed.

7.2.3.3 Transmitting and rating the reading

The "reading" was relayed from E to S in real time, typed letter by letter to S's terminal screen. A question mark would be typed to indicate that a message was complete, and thus that S should judge its applicability. Ss then rated the statement for accuracy using a 5-point scale, after Carrier (1963), where 1 = almost entirely wrong, 2 = more wrong than right, 3 = about half and half, 4 = rather good, and 5 = amazingly accurate.Ratings were registered via a 5-button choice box connected to their computer. Ss were told that the assessment would appear to them on-screen as feedback and to the experimenter to be recorded, but that the reader was given no feedback other than that the client was ready for the next impression. After a rating had been registered, that message would disappear from the screen.

All Ss received feedback consisting of the same 15 Barnum statements. They were also given a subset of 5 statements based on loose interpretations of the cards found in positions 1 through 5 of their spread. Because it is highly unlikely that merely shuffling the pack would be sufficiently random to allow us to infer anything meaningful from the items "selected" by Ss, responses to these statements did not form part of the planned analysis. The order of presentation of statements was counterbalanced across Ss, principally to control for any primacy and recency effects

which could confound any recall measure, and to encourage different Ss to remember different items should they subsequently compare experiences.

Once the statement list was exhausted, S received the message "END" on-screen, at which point they gave pencil-and-paper ratings of their overall impression of the reading. This took 3 forms; "How accurate would you rate the reading as a whole? Do you think the reader was able to show that he had the ability to accurately describe people he had never met, by using Tarot cards? How accurate do you think this reading would have been if given to someone else?". These ratings are difficult to interpret, since they are based on a sketch that does not consist solely of Barnum statements, but rather includes items based on the card spread and which thus varied across Ss. They are included here as exploratory analyses.

7.2.3.4 Recall

Immediately on completion of the task, Ss were given a 'surprise' recall test, being asked to "give an account, as accurately as possible, of what the reader said to you". It was stressed that this should be as close to verbatim as possible. Ss were presented with a recall sheet on which to record their responses. This sheet consisted of a series of numbered boxes corresponding to the number of statements they had been given. There was no time limit to this recall stage, indeed Ss were encouraged to work as long as was fruitful at retrieving what had been communicated to them.

Ss were then provided with a handwritten account of the reading, contained on a printed sheet similar to that used to record their recall, which had ostensibly been completed by E as the reading was being transmitted. Ss were asked to try and link their recall to the specific statements which prompted them. In this way we hoped to avoid the difficulties of attempting to determine which recall item related to which actual statement, a procedure which could be problematic where recall is incomplete or distorted.

7.2.3.5 Debrief

Ss were not debriefed until after all Ss had acted as judges, to ensure that they did not have the opportunity to discuss the procedure with others who may have been due to participate. Subsequently, however, a full and sympathetic debrief was given to Ss individually during which they were made aware of the necessity for deception in this context, and were given the opportunity to discuss the study in as much or as little detail as they required.

Investigations of the Barnum effect necessarily involve an element of deception, and great care needs to be taken in these circumstances to protect Ss' self esteem when revealing the nature of the deception to them. Indeed, the Barnum Effect has itself been used as source material for discussing the ethics of deception generally (Beins, 1993). However, the treatment of Ss in Barnum studies has been far from ideal, with few authors providing details of the debrief undertaken (if any) (Collins et al., 1977, is an exception). To redress this unfortunate oversight, I provide here full details of

the debrief provided in this and the subsequent study. The exact form of the debrief varied in response to individual S's needs but the following provides an accurate overview.

The debrief had three main thrusts;

(a) Introducing the notion of demand characteristics; where Ss start acting as subjects and stop acting like people. Illustrating the consequences with reference to an imaginary (and simplified) study considering the effects of ink colour upon reading ability. This emphasised how Ss who have some sophistication in Psychology (and all Ss here were psychology undergraduates) may be competent enough to be aware of the likely variables in a study, and to hazard guesses about the experimenter's likely predictions about their relationship, which in turn could have consequences for their performance.

(b) Informing Ss that the reading they received was not in fact specifically derived for them but was in fact made up of statements which had been used by psychic readers in the past. The reason for them being presented here was as a first step in assessing an alternative method of evaluating psychic claimants. It was suggested that the quasi-objective work carried out, for example, by Boerenkamp misrepresented the actual function of the psychic reading. Typically, the sitting does not represent an occasion when the reader needs to prove how psychic he is by producing the most esoteric information

about the client that he can muster. Rather he is attempting to provide a service for the client. The client comes with particular problems, concerns, or decisions to make which she hopes the reader will be able to divine paranormally, and then go on to provide a framework through which to arrive at a solution. Presumably this latter will also be paranormal in origin and thus have greater likelihood of being successful.

(c) Unfortunately, when the client thinks about herself and her problems, she doesn't do so by recalling specific events from her history. Rather she tends to describe herself by generalisation, using categorical terms, even cliches. Similarly the kind of problem she is experiencing is one from a surprisingly small number, and tends to be tied to particular stages of life. Thus if the claimant was psychic but was gleaning his information by telepathy directly from the client herself, he would be tied to talking about her in the same general terms which she uses to describe herself. Superficially, it would be difficult to discriminate between potentially paranormally-mediated information and information which is easily guessed or readily inferred. It does support the notion that work such as Boerenkamp's is in danger of throwing the baby out with the bathwater.

It may be, however, that the information can be separated by virtue of the depth of meaning which the statement has for the subject. While all subjects will be able to recognise that, to some extent at least, the statement could be

applicable to most people, the target person may have the impression that although the statement could be seen as true for most people, there is a sense in which it is particularly or especially true of them at that time. For example, while most people would agree to some extent that children play an important role in their life, to the person seriously considering changing university major to enable them to become an educational psychologist, this would have an added dimension of meaning. This added salience or centrality in the person's self-concept or thoughts about their life, was loosely termed 'the oomph factor'.

7.3 Results

7.3.1 Manipulation of statement acceptance

A preliminary concern is to gauge how successful the manipulation of statement favourability was in depressing Ss' ratings for some items. It was essential that a reasonably broad range of acceptance was generated within each reading, since this provided the source material with which to investigate the effect of different acceptance levels on the way the information is represented (as evidenced by differences in recall). Three sets of statement were identified during the pre-study as high, moderate, and low acceptors. Figure 7.1 compares the mean ratings achieved by these three types of statement, with the data transformed so that high ratings indicate greater acceptance.

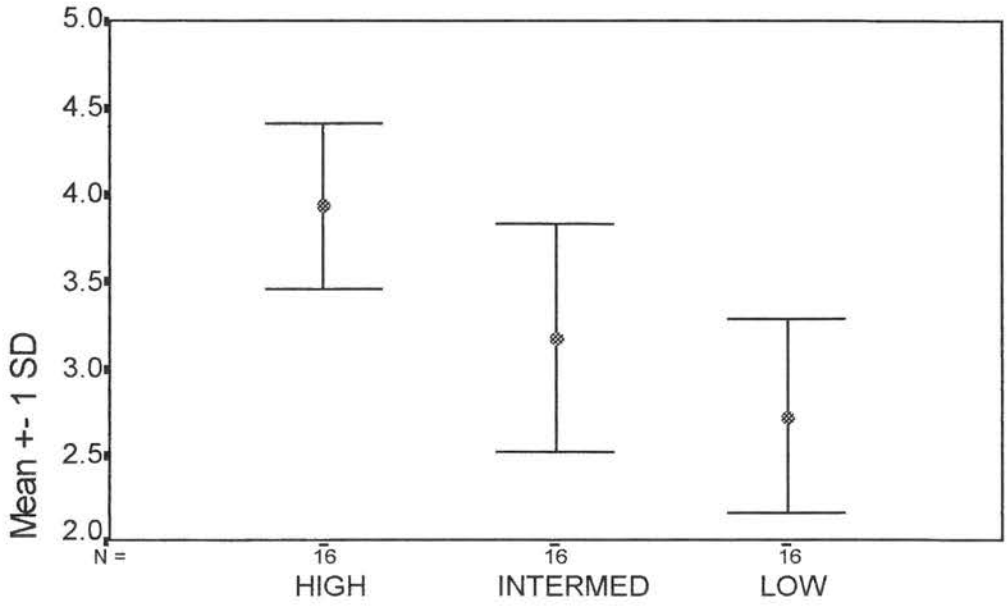


Figure 7.1: Mean acceptance rating for statements of different favourability

The high acceptor pool consisted of favourable items which were most highly accepted in the pre-test, low acceptors were unfavourable items which were poorly accepted there, and intermediate items were a mix of favourable and unfavourable which had been moderately accepted. We can see that, as intended, the items induced similar levels of acceptance here; as the favourability of statements decreased, so Ss became less impressed with them as an accurate representation of their own personality. Both highly-favourable and neutral items were on average rated as more accurate than not (rating higher than 3: "about half and half"), whereas unfavourable items scored below this mid point (between 3 and 2: "more wrong than right"). This trend is significant [Page's $L = 218$, $n = 16$, $p < .001$], indicating that Ss were progressively more accepting of items as their favourability increased, allowing us to

reject the null hypothesis in favour of H_2. Interestingly, with a mean rating of 2.37, card-derived statements were actually preferred to Barnum feedback generally [Wilcoxon Z = -2.48, p = .01, 2-tailed], and did not fare significantly worse than the positive subset [Wilcoxon Z = 1.43, p = 0.15, 2-tail].

7.3.2 Statement acceptance

It is also important at this stage to gauge whether the use of the novel environment of a simulated psychic reading had any effect on Ss willingness to accept feedback. In other words, can we be confident that the Barnum Effect is influential under these conditions. We can address this initially by considering the distribution of ratings which Ss allocated to the statements which made up their reading. These data are presented in Figure 7.2.

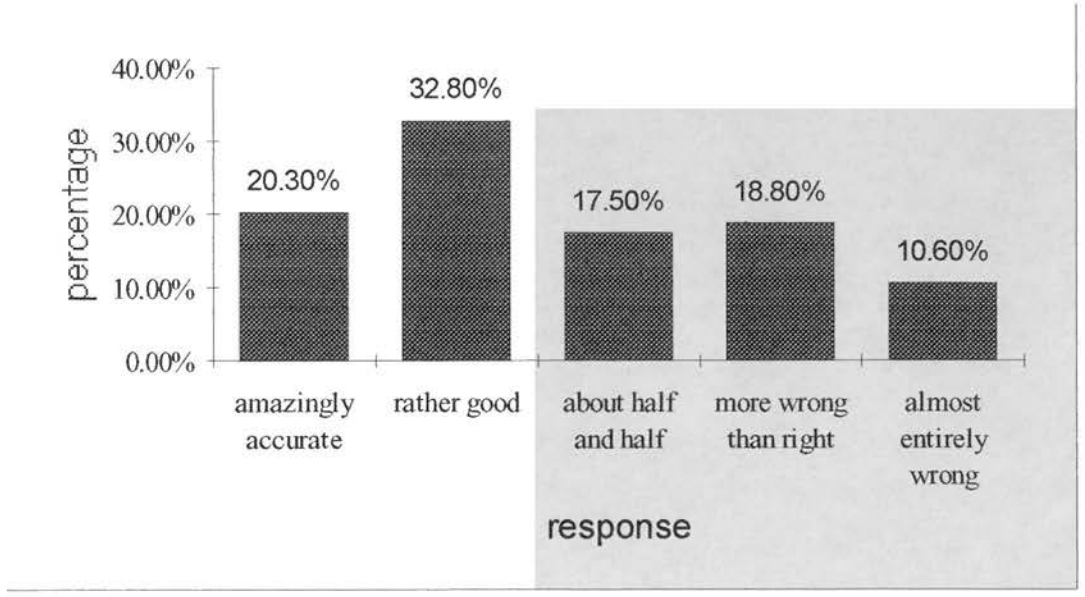


Figure 7.2: Incidence of ratings at each acceptance level for all statements.

The data indicate that there is a very unequal distribution of acceptance ratings, with over 53% of statements being rated by Ss as "rather good" or better, where we would expect only 40 % to be so-rated by a chance distribution. In contrast, there are fewer statements rated "more wrong than right" or worse than expected (less than 30% as compared with 40%). If we re-categorise the data into two cells, *accept* and *reject*[16], we find that of those who expressed a preference, 64.4% accepted whereas only 35.6% rejected the item, deviating in the predicted direction to a highly significant degree [$z = 4.62$, $p = .000003$]. This effect is far from apparent when considering the mean rating for all statements which, with a value of 3.33, suggests only a weak effect.

7.3.3 Overall ratings

Ss overall ratings for their reading are summarised in Table 7.1. Ratings of reading accuracy were given on a 5-point scale, where 1 = 'amazingly accurate', 3 = 'about half and half' and 5 = 'almost entirely wrong'. Although Ss tended to rate the reading overall as slightly more accurate than the midpoint rating, this was not to a significant degree [Wilcoxon $Z = -1.05$, $p = .14$, 1-tail]

	Mean rating	standard deviation
Accurate reading	2.75	0.93
Reader's claim valid	3.31	1.01
Reading applicable to others	2.69	0.79

Table 7.1: Mean summary ratings of the applicability of the reading to self and to others

Ratings of whether the reader had demonstrated his claim to accurately describe people through the Tarot cards were given on a 5-point scale where 1 = 'definitely yes', 3 = 'unsure', and 5 = 'definitely no'.). Here, Ss tended to rate the reading as not supporting the reader's claim, but again not to a significant degree [Wilcoxon Z = -1.11, p = .13, 1-tail]. Thirdly, Ss rated the degree to which the reading would apply to others using the same scale as for themselves. There was a suggestive tendency to believe that the reading would apply to others [Wilcoxon Z = -1.40, p = .08, 1-tail], although the assessments of applicability to self and to others did not differ significantly [Wilcoxon Z = -0.31, p = .75, 1-tail]

7.3.4 Covariance with personality measures

Traditionally Barnum statement acceptance covaries in a characteristic (if somewhat weak) manner with Ss scores along certain personality measures believed to be related in some way to the fairly nebulous concept of "gullibility". Two of the most successful indicators reported thus far - locus of control and social desirability - were implemented here. Mean Barnum scores were generated for each S based on their ratings of the 15 test items, and these were compared with their scores on the three questionnaires administered prior to their reading. These relationships, described in terms of Spearman's rho correlation coefficients, are summarised in Table 7.2.

Correlations for Tarot-derived statements are included here for information, although (as has been noted) no formal treatment of these data is warranted. Comparisons between the two personality measures and Barnum acceptance gave rise to positive,

but ultimately non-significant correlations, according to conventional p values. In this case, then, we are required to reject H_3 and H_4. It should be noted, however, that since the value of r_s is essentially a measure of effect size (cf. Rosenthal & Rosnow, 1991, p.21), the effect generated here with respect to the relationship between Ss' acceptance and their scores on a measure of social desirability is comparable with that from previous studies. This notwithstanding, the present study should be regarded in conventional terms as a failure to replicate the effect. The relationship between paranormal Belief and acceptance was very weak and likely due to chance, so that little store should be set by the apparent negative relationship, although it would be interesting to see if the effect persists with a larger sample of subjects.

	social desirability	**locus of control**	**belief**
Tarot-derived statements	0.349	-0.281	-0.163
Barnum statements	0.221	0.116	-0.111

correcting for multiple analyses requires a correlation of 0.66 for significance (alpha set at $p < .007$)

Table 7.2: Correlation coefficients for comparisons of acceptance ratings for presented statements with personality measures.

7.3.5 Analysing recall

Recall was analysed by E, who was blind to Ss' ratings of each statement. Analysis consisted of rating the similarity between each item of the reading and Ss recall for that item, using a three-point scale, where 0 = not recalled at all, 1 = recalled with

distortion, and 2 = recalled accurately. However, it was found that the number of items which were recalled in a distorted form were few, and even in these cases the transformations were slight (consisting mainly of syntactic shifts rather than true semantic distortions). Therefore the data was re-analysed using a dichotomous scale in which items were adjudged either to have been recalled in some form or not recalled at all. E's classifications, along with Ss' own acceptance ratings were used to categorise items as illustrated in Table 7.3;

		5 (amazingly accurate)	**4** (rather good)	**3** (about half and half)	**2** (more wrong than right)	**1** (almost entirely wrong)	Totals
Not Recalled	obs.	22	47	22	32	20	143
	(exp.)	(29)	(46.9)	(25)	(26.8)	(15.2)	
Recalled	obs.	43	58	34	28	14	177
	(exp.)	(35.9)	(58.1)	(31)	(33.2)	(18.8)	
Totals		65	105	56	60	34	320

Table 7.3: number of items recalled in relation to prior acceptance rating

Although the data is compromised to some extent by the uneven distribution of ratings across the 5 judgement categories, the result does provide some evidence of a tendency for Ss to better recall items which were accepted over those which were rated as less accurate. The overall trend is perhaps more clearly illustrated in Figure 7.3. The bars represent the proportions of items of each type that were recalled relative to that expected by a chance distribution - a positive histogram indicates that the item type was recalled more often than expected, whereas a negative one indicates that it was recalled less often.

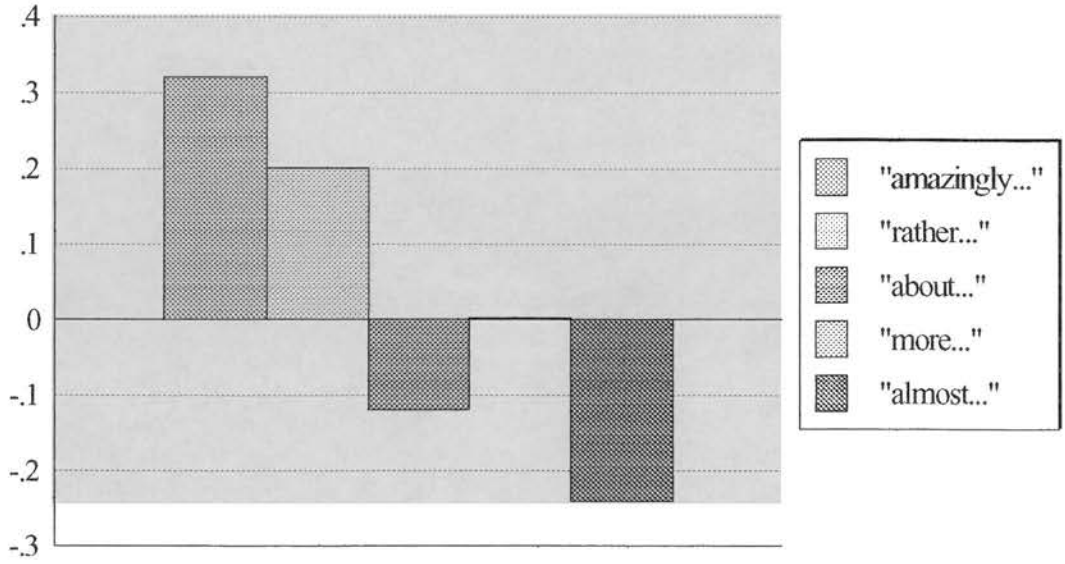


Figure 7.3: No of items recalled (above that expected by a random distribution) as a function of original acceptance rating for that item (using [O-E]/E)

Although the relationship does not appear to be altogether straightforward, with the trend for more moderately-rated items appearing quite confused, things are more promising for the extreme S ratings of 1 and 5. There is a marked tendency for Ss to remember more items adjudged "amazingly accurate" and fewer items thought "almost entirely wrong" than would be expected from a random distribution. The overall effect is quite weak and fails to achieve significance [χ^2 = 8.31, 4df, p = .081], and only very tentative conclusions are justified. However, the trend is in the predicted direction, and of a magnitude which approaches significance. Table 7.4 presents the data re-categorised as either 'accepted' or 'rejected', with neutral items again omitted.

		Accept	Reject	Total
Not recalled	observed (expected)	69 (77.9)	52 (43.1)	121
Recalled	observed (expected)	101 (92.1)	42 (50.9)	143
Totals		170	94	264

Table 7.4: number of items recalled in relation to prior acceptance or rejection

This distribution suggests that recall of reading statements is contingent on accepting that item as true when initially presented [*post hoc* $\chi^2 = 5.27$, 1df, $p < .05$].

7.4 Discussion

The manipulation of favourability had the desired effect of inducing differential acceptance of Barnum statements, and in itself constitutes a replication of one of the more robust findings of Barnum research (see e.g. Snyder & Shenkel, 1976; Halperin et al, 1976; Weinberger & Bradley, 1980). It does, however, generate problems in interpreting whether the Barnum Effect in gross form is influential in the context of a psychic reading, since it inevitably acts to depress Ss overall ratings. It would be difficult to compare acceptance levels here with studies which did not similarly manipulate favourability. Problems also exist in attempting to make inferences about the likely overall acceptance level had all statements been favourable, since this subset of 5 items is much too small to be considered sufficiently representative.

In any case, there is no fixed standard of acceptance beyond which the Barnum Effect can be said to be operating. Merely looking for ratings above the mid-point is facile, and theoretically weak. Comparison with other recent Barnum research is also unhelpful, because this work tends to be process-oriented, and rarely gives details of gross acceptance, preferring instead to concentrate on differences in ratings across conditions, or with respect to certain personality variables. Even Forer's (1949) seminal study, intended to demonstrate the effect, reports results for each statement only in terms of numbers of Ss who "accepted", "rejected" or were "uncertain", despite using a 5-point ratings scale in the study itself. We can only conclude that the support reported here for H_1 is suggestive, and look to the use of the same statement set in a more conventional Barnum setting to provide a more direct comparison from which to determine the effect of using this novel context.

If we consider Ss overall ratings we find that they did not accept the rating as any more accurate than 'half and half', the midpoint, and were undecided as to whether their experience supported the reader's claim to have access to information about them. This may be accounted for by their believing that the reading would also tend to apply to others, which indicates that they recognised its general nature.

Ss ratings for the card-derived statements are also worthy of comment. It is interesting to note that Ss accepted these items as more accurate than the Barnum statements they were presented alongside. Indeed, the 'interpretations' did not fare significantly worse than the subset of Barnum statements selected as high accepters.

This may be considered as a replication of the tendency, noted in the previous chapter, for pseudopsychic items to act in a manner similar to conventional Barnum statements (although it does not account for their superior rather than equivalent performance here). However, we have to be wary of reading too much into this effect, principally because the Barnum effect has been depressed here by the use of neutral and negative versions of statements as well as the more typical positive versions. Of course, the mechanism by which the Tarot is claimed to work involves the selection of particularly appropriate cards from among the larger available set, but experimental research with cards as a divination tool does not support such an interpretation (e.g. Blackmore, 1983). In any case, the sham Tarot spread generation was conducted with a cut-down deck, and the selection of cards can hardly be described as truly random. It would be interesting to see if this preference persists when these shortcomings are overcome.

Indirect support for the action of the gullibility model of the Barnum Effect could have been claimed if Ss' acceptance levels had covaried with their scores on measures of social desirability and locus of control, as has been reported previously (e.g. Snyder & Larson, 1972; Orpen & Jamotte, 1975). It is perhaps a little surprising, then, to note that neither effect reached significance here. It could plausibly be argued that failure to detect an effect in the present study is explained, at least in part, by the relatively small subject pool involved. This is highlighted by the effect size of the correlation between Ss scores on social desirability and their level of Barnum acceptance, which at .221 is in keeping with that reported by others

(e.g. Mosher, 1965). However, it does represent a relatively weak effect; one which would require a sample size of 78 Ss in any single study to afford it a 50/50 chance of achieving conventional significance - if the effect is consistent (see, e.g., Rosenthal & Rosnow, 1991: 439-456). The data for locus of control are less encouraging, and must be regarded as casting some doubt upon the influence of this particular personality variable.

Failure to find convincing effects of personality variables upon Barnum acceptance would be less surprising if the effect itself was shown to be explicable in terms of an artifact of cognitive processing rather than as the expression of a personality trait not unlike gullibility. An initial attempt to evaluate this alternative was conducted here through the analysis of Ss subsequent recall for their readings. If this recall is favourably selective or distorted such that it presents a more coherent and accurate account of the S's actual personality, then it would tend to support the notion that the message has been actively processed by Ss in order for it to have meaning for them. It would also bear upon the question of whether acceptance was anything more than mere acquiescence, as suggested by Johnson et al (1985) and which undoubtedly *would* be related to the personality factors mentioned previously, since it is difficult to explain why such a process should occur if Ss are only acquiescing, i.e. where commitment to the sketch is virtual rather than actual.

The evidence from this study is mixed. It was found that Ss *were* more likely to remember statements which they had previously accepted as true than those which

they had rejected, but this effect failed to achieve significance at the .05 level. However, the trend generated quite a reasonable effect size of .35, and produced a significant difference post hoc when recategorised as either 'accepted' or 'rejected'. Here again we may look to the small subject pool as a plausible cause of this failure, rather than necessarily concluding that the experimental hypothesis should be rejected. If the effect is consistent, then a replication using just 31 Ss would give a 50/50 chance of achieving conventional significance levels, whereas using a pool of 166 Ss should allow us to be certain of capturing the effect, should it be genuine.

More powerful support for the cognitive processing interpretation would be likely to come from a consideration of the number and type of distortions which occurred in attempting to recall massages, in particular if these shifts in meaning varied with level of acceptance both across statements and across Ss as outlined in H_6 . Unfortunately such a treatment was not possible here because the number of items which were recalled in a distorted form were few, and even in these cases the transformations were slight (consisting mainly of syntactic shifts rather than true semantic distortions). This effectively prevents us from evaluating H_6 , since no data were generated to allow us to decide between it and the null hypothesis. By default it would seem that the prediction has been refuted. Two factors would seem to be particularly responsible for the unexpected accuracy of recall in all conditions (i.e. irrespective of initial acceptance level), namely opportunity to adopt practices which led to improved recall, and the use of immediate rather than delayed recall which may not have allowed sufficient time for memorial distortion.

Messages were transmitted letter by letter, using BBC micro computers connected by an RS232 interface in a procedure which was painfully slow. Letters appeared at a rate determined by the limited transmission rate, which caused them to be presented at regular intervals (approximately 2 letters per second). This may have undermined the intended impression of real-time typing. Ss later reported that the experience of waiting for a message to be completed was at best a little cumbersome, but at worst downright tedious for them. In such circumstances, activities such as rehearsing or "second guessing" the message would provide diversionary relief, and these could certainly have had some effect on subsequent recall as they allow deeper processing than would otherwise be the case (cf. Craik & Lockhart, 1972; Craik & Tulving, 1975). More efficient transmission should act to minimise this - so long as it does not lead to a presentation so polished that it lessens Ss conviction that they are involved in an actual (rather than computer simulated) communication.

In retrospect, the use of immediate rather than delayed recall was an error, as it apparently did not allow Ss time for their representations to become degraded. Use of staggered (across Ss) delay periods should allow some insight into the way in which recall changes (if at all) over time. That virtually immediate recall could still generate omissions but not distortions suggests that the former occurs at encoding while the latter is a product of retrieval. It will be interesting to see if this phenomenon is replicated in future work.

Study 2

7.5 Introduction

This study was designed to overcome a number of the methodological flaws identified in study 1. Improvements in the code of the computer program allowed letters to be transmitted at much faster speeds, allowing the presentation of material in a form which more realistically simulated real-time typing (for example with shorter - and more varied - delays between 'key presses'). Errors could now be corrected with a 'delete' coded key which allowed more errors to be introduced to reinforce the sham context.

Tarot study 1 was compromised by having to include some elements of the reading which were derived from the cards in the Ss Tarot spread. This was originally included for three reasons; firstly to lessen the degree of deception, since some aspects of the reading would genuinely be derived from their cards; secondly to allow the use of statements which at the time could not be strictly regarded as Barnum statements (as their performance hadn't been experimentally verified) but which generated information which Ss may regard as more typical of a psychic reading, thus giving the sham context greater face validity; thirdly it would have been interesting to compare acceptance rates for these 'selected' cards with those from the Barnum pool because of the parapsychological implications (perhaps clients are in some way 'selecting' particularly appropriate cards). This measure was

regarded as unnecessary here because pseudopsychic statements could be drawn from a pool which have now been evaluated (see Chapter 5), and also because of concern that the randomising procedure (shuffling) was not sufficiently satisfactory for any results to bear upon the third factor (see Palmer, 1992).

Tarot study 1 used three subsets of Barnum statement, which differed in their degree of favourability, which it was expected would induce different degrees of acceptance. This was necessary to study recall trends associated with acceptance. It was felt that the same function - inducing differential acceptance of different items - could be as easily achieved with just high and low accepters. Some of the low items would be likely to be accepted quite highly by some Ss, and similarly some high items would achieve only low ratings with some Ss, thus producing a reasonable distribution of ratings. The five high and five low favourability items from Tarot study 1 were used again here, along with a subset of the five highest and five lowest accepted statements from the list of pseudopsychic statements used in the study described in Chapter 4. The full list of statements is included as an appendix.

However, the main improvement was to encourage greater decay of memory for the reading by introducing longer delays before the recall element. In this way, it was hoped to sufficiently sensitise the DV to allow us to effectively test predictions made by the cognitive processing artifact model. In choosing durations of delay before testing recall, we were informed by Ebbinghaus' (1913) classic investigation of

memory which described an exponential rate of memorial decay. This relationship is reproduced here as Figure 7.4.

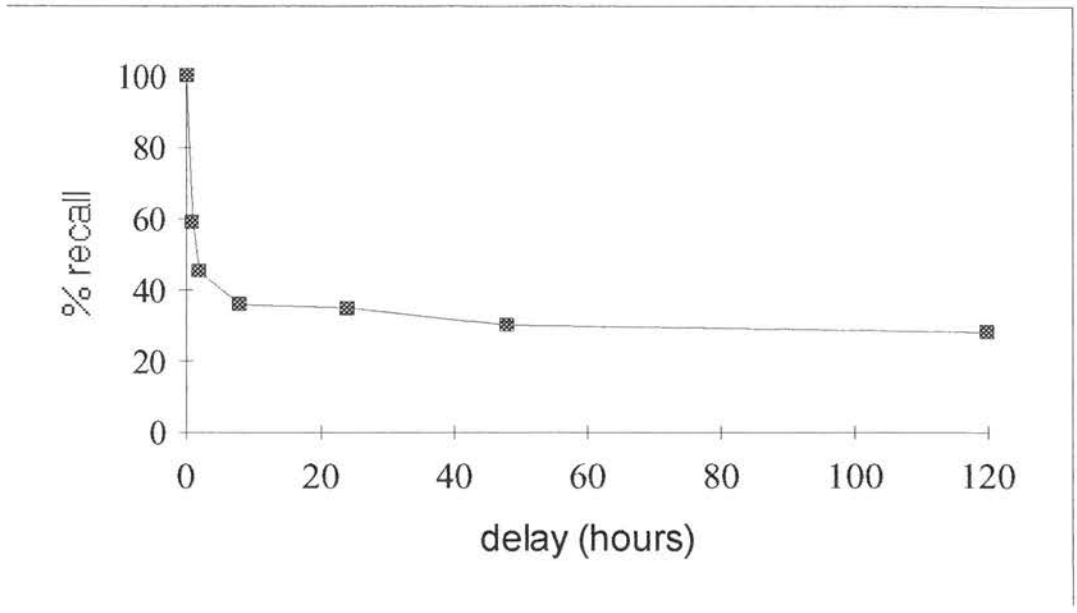


Figure 7.4 Rate of forgetting verbal material (from Ebbinghaus, 1913)[17]

Ebbinghaus' account is still regarded as reasonably accurate (see. e.g., Baddeley, 1990; Wickelgren, 1975). Anderson has accounted for this deterioration in terms of interference (1985; Anderson & Paulson, 1977), although it seems that just as our muscles will atrophy with lack of use, so will neural connections (Barnes & McNaughton, 1980) so that this deterioration also follows a power law. Because of this logarithmic decline in rate of forgetting, delays of the order of 20 minutes, 24 hours, and 7 days were selected to allow for approximately equal amounts of further deterioration in the memory trace.

From study 1 it was calculated that with a 'medium' effect size of .35 (cf. Rosenthal & Rosnow, 1991, p. 444), we would need 31 Ss to have a 50% likelihood of capturing the differential recall effect at conventional significance levels, and 188 Ss to guarantee its detection (if genuine). This sets our minimum criterion at 31 Ss. Since the study is time-intensive (each S requires at least two hours of individual attention at times which suit them) and was scheduled to be conducted in a four week period during which Ss would still be available, the actual sample size would be closer to this value than 188. Given that there were three delay periods before recall, it was decided to restrict the sample to 48Ss, so that each 'condition' would have an equal number of Ss to that run in Tarot study 1.

7.6 Study aims

Study 2 was intended to replicate the findings of study 1, but with the introduction of methodological refinements to allow the cognitive processing artifact model to be evaluated. In this vein, the 6 hypotheses from study 1 are retained here:

H_1 : General acceptance will be high, and in the range of previous BE research.

H_2 : Ss' overall acceptance ratings will increase as their locus of control scores tend to the external.

H_3 : Ss' overall acceptance ratings will increase as their scores increase on a measure of social desirability.

H_4 : Gross recall on a surprise test will be better for those statements that achieved a high initial acceptance than for those that were rejected.

H_5 : Of those statements that are recalled, there will be a tendency for the degree of distortion in recall to increase as acceptance ratings increase.

7.7. Method

7.7.1 Apparatus / Materials

The measures of locus of control, social desirability, and belief in the paranormal used in study 1 were adopted again here. The statement set consisted of the five positive and five negative statements from study 1, to which were added the five highest and five lowest rated pseudopsychic statements from the House Tree Person study (see Chapter 5). Statements were presented to Ss via an RS232 interface link between two BBC model B microcomputers, using an adapted version of the BASIC program produced by the author for study 1.

7.7.2 Subjects

46 first year psychology undergraduates at the University of Edinburgh (16 male, 30 female, aged 18-23) acted as subjects[18]. The sample was chosen to minimise the likelihood that they had been exposed to the Barnum Effect through their studies, or that they had become suspicious of hidden agendas as a result of experiencing deception in other psychology class experiments. This study was conducted in the following academic year to study 1, so that it is unlikely that Ss had interacted with previous participants

7.7.3 Procedure

The procedure adopted in study 2 was similar to that for study 1, so only a limited description is given here, focussing mainly on substantive changes from the procedure described earlier.

7.7.3.1 Recruitment

Students were again recruited during compulsory tutorials to assist in the assessment of a claim made by a Tarot card reader. Care was again taken to ensure that Ss felt under no obligation to participate. Measures of locus of control, social desirability and belief in the paranormal were distributed to be completed by Ss at home prior to attending their reading. Ss were told that they would be expected to attend the department on two occasions; once when the reader was present to be given their reading, and once to discuss their impressions of the reading with E in more detail.

7.7.3.2 Generating a card spread

Ss were introduced to the sham protocol which was explained in terms of avoiding involuntary leakage of information, and were primed to expect mainly personality-based information (although the reading material was more suited to the psychic reading context, since it included items drawn from pseudopsychic sources). Ss were shown the Tarot set and were guided through the process of generating the Grand Cross arrangement. Once completed, the arrangement was taken by E, ostensibly to take to the reader, and S awaited transmission of the reader's impressions to their terminal..

7.7.3.3 Transmitting and rating the reading

The reading was transmitted to S statement by statement in real time, and appeared typed letter by letter on-screen. The more rapid transmission rate allowed E to introduce and correct more errors into the readings and to vary the delay between statements to simulate 'thinking time'. For some trials, an accomplice[19] was able to take over the task of typing the reading to allow E to reinforce the notion that a claimant was conducting the reading. E occasionally visited S (while an item was being transmitted) to check that all was well, but mainly ensured that he was visible to casual observers (who may be future participants). All Ss received feedback consisting of the same 20 Barnum statements. The order of presentation of statements was counterbalanced across Ss, principally to control for any primacy and recency effects which could confound any recall measure, and to encourage different Ss to remember different items should they subsequently compare experiences. (Ss were actively discouraged from discussing their reading with others until after the debrief session. This was justified on the grounds that it may set up certain expectations in later subjects which would affect their rating of the reading). Once the statement list was exhausted, S received a message on-screen from R which indicated that the reading was over. All Ss then completed the 3-item overall ratings questionnaire.

7.7.3.4 Recall

Ss were randomly allocated to one of the three conditions by reference to a pre-generated order determined by coding data from random number tables (RAND,

1955). Allocation was left until the time of the reading because of the relatively high rate at which participants fail to attend at an agreed time, which could unbalance the number of Ss in each condition. For Ss in the 20 minute delay condition, E visited them at the end of the reading and explained that he had to attend to the reader (to check on his welfare as an invited guest of the department and to gather initial impressions of how the reading had gone from his viewpoint). In fact, E simply waited the prespecified 20 minutes and returned to give S a surprise recall test. A second appointment was arranged for the earliest opportunity to allow S to be debriefed. Ss in the other two conditions were asked to arrange a second appointment to discuss in more detail their reaction to the reading. E ensured that this appointment either occurred the next day (at approximately the same time of day, morning for morning, afternoon for afternoon) or the same day the following week, depending on condition.

On returning for the second appointment, Ss were given the 'surprise' recall test, being asked to "give an account, as accurately as possible, of what the reader said to you". Ss in both these conditions were debriefed immediately on completion of the recall task.

7.7.3.5 Debrief

The debrief followed a similar format to that in study 1, and was such that it emphasised the necessity of the deception and the steps which had been taken to minimise any of its potentially negative effects. Ss were given the opportunity to

discuss the study in as much or as little detail as they required. One pleasant result of this attention and care was that Ss were happy not to subsequently discuss the procedure with others who may have been due to complete the study - as evidenced by the comments of these later Ss. It should be noted that, as with study 1, Ss appeared to be pleasantly surprised by the deception and showed no ill effects of being deceived (in terms of annoyance or embarrassment, for example).

7.8 Results

7.8.1 General acceptance

It is of interest to determine whether the use of the novel environment of a simulated psychic reading had any effect on Ss willingness to accept feedback. Table 7.5 presents the incidence of acceptance or rejection of items, with responses collapsed to give three cells, accept, neutral and reject.

	Accept ("amazingly accurate" or "rather good")	**neutral** ("about half and half")	**Reject** ("more wrong than right" or "almost entirely wrong")
Observed	483	175	262
Percentage	52.5%	19%	28.5%

Table 7.5: Incidence of acceptance or rejection of statements

It is evident that there is a very unequal distribution of ratings, with a marked tendency for Ss to accept items as being accurate. Comparing only the incidence of S acceptance or rejection with expected values, we find a highly significant deviation in the predicted direction [$\chi^2 = 65.56$, 1df, $p < .001$], which allows us to accept H_1.

7.8.2 Overall ratings

Ss overall ratings for their reading are summarised in table 7.6. Ratings of reading accuracy were given on a 5-point scale, where 1 = 'amazingly accurate', 3 = 'about half and half' and 5 = 'almost entirely wrong'. Ss rated the reading overall to be more accurate than the neutral response of 3 [Wilcoxon Z = -3.03, p = .0012, 1-tail].

	Mean rating	standard deviation
Accurate reading	2.52	0.84
Reader's claim valid	3.04	1.13
Reading applicable to others	3.09	0.66

Table 7.6: Mean summary ratings of the applicability of the reading to self and to others

However, Ss did not regard the reader as having demonstrated his claim to accurately describe people through the Tarot cards [Wilcoxon Z = -0.35, p = .72, 2-tail]. Ss did not rate their reading as being more applicable to others than the midpoint of 'half and half' [Wilcoxon Z = -0.78, p = .42, 2-tail], and their ratings of applicability to self and to others differed significantly [Wilcoxon Z = -3.10, p = .001, 1-tail].

7.8.3 Covariance with personality measures

The relationship between acceptance and personality measures, described in terms of Spearman's rho correlation coefficients, are summarised in Table 7.7.

	social desirability	**locus of control**	**belief**
Barnum statements	0.065	0.231	0.353

Table 7.7: Correlation coefficients for acceptance with personality measures

Both personality indicators gave rise to positive, but ultimately non-significant correlations [for social desirability, $r_s = .065$, n.s.; locus of control, $r_s = .231$, n.s.], thus failing to lend support for H_2 and H_3. It is interesting to note a positive relationship between belief and acceptance [$r_s = .353$, $p < .05$], which indicates that believers in the paranormal were more persuaded that the reading was an accurate description of them. It should also be noted that there was no relationship between declared belief in the paranormal and scores on locus of control and need for approval [$r_s = .09$ and .16 respectively].

7.8.4 Analysing recall

Recall was analysed by three judges (one of whom was the experimenter) working independently. All judges were blind to Ss' acceptance ratings for each statement. Analysis consisted of rating the similarity between Ss' recollection of each item of the reading and its presented form, using a four-point scale where 0 = not recalled at all, 1 = recalled with distortions which modify the original gist of the statement, 2 = recalled with distortions, but with the overall gist retained, and 3 = recalled accurately. Recall scores were then compared with the original rating for that item.

The cognitive processing artifact hypothesis predicts that Ss will recall more items which were originally accepted than those which were rejected. Frequency of recall for accepted and rejected items is given in Table 7.8. Although there is a slight trend in the direction predicted by H_4, the difference is not significant [$\chi^2 = 0.289$, n.s.], suggesting that original acceptance of the item did not affect the likelihood of it

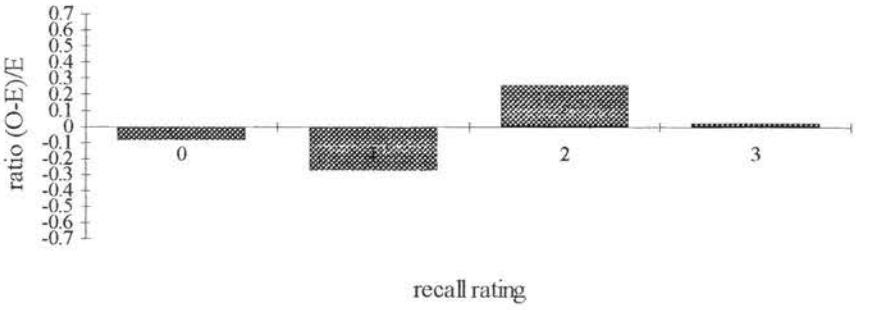
being recalled. However, such a conclusion may be simplistic as it ignores the distinction between different types of recall. Figure 7.9 illustrates in more detail the effect of original rating upon recall. Recall rates are given for items which were strongly accepted or rejected (rather than combining across conditions) because it was felt that studying the effect *in extremis* would more clearly illustrate any underlying mechanism.

		Accept	**Reject**	Total
Recalled	observed (expected)	257 (253.5)	134 (137.5)	391
Not recalled	observed (expected)	226 (229.5)	128 (124.5)	354
Totals		483	262	745

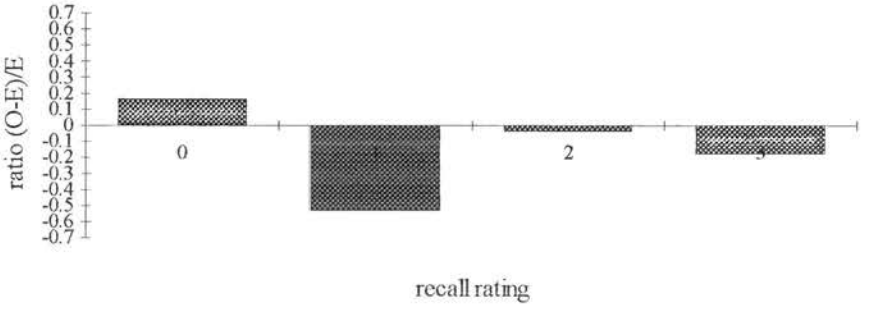
Table 7.8: gross recall for accepted and rejected items

The bars represent the proportions of items of each type that were recalled relative to that expected by a chance distribution - a positive histogram indicates that the item type was recalled more often than expected, whereas a negative one indicates that it was recalled less often. From this, we can see that Ss tend not to forget those items to which they responded extremely, either in strongly accepting or strongly rejecting the description. Rather, it seems to be those items about which Ss were ambivalent that suffer most from being forgotten completely.

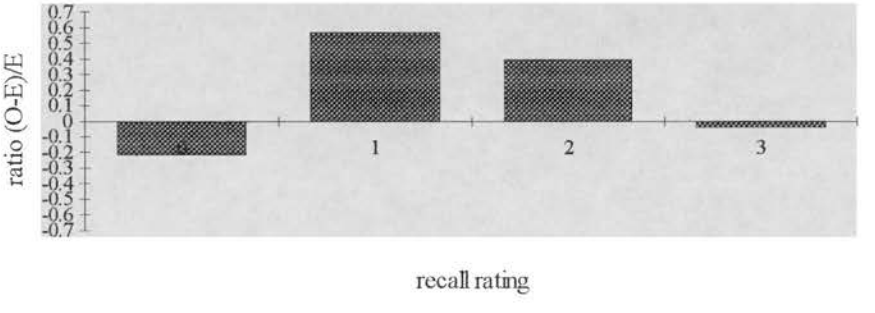
Acceptance rating 1: almost entirely wrong



Acceptance rating 3: about half and half



Acceptance rating 5: amazingly accurate



However, when we consider the integrity of recalled items, we find very different patterns; where rejected items are remembered, the original meaning seems to have been retained, with any distortions in form tending to be superficial. In contrast, Ss are much more likely to remember *accepted* items in a form which is so distorted as to have altered the original gist of the item. Further analysis supports this impression, indicating that the higher the original rating, the greater the tendency to distort recall (giving a low recall rating) [$r_s = -.115$, $p < .01$, 1-tail], in line with H_5.

7.9 Discussion

Acceptance was higher here, with Ss rating the sketch overall as significantly more accurate than the midpoint of 'half and half', which may be a consequence of the shift in study 2 away from emphasising greater variability in acceptance. Although they believed the reading to be more applicable to them personally than to others, this impression did not extend to believing that the reader had demonstrated his claim to paranormal access to information about them.

Study 2 also failed to find support for the gullibility hypothesis, with acceptance not significantly related to either locus of control or social desirability. Although there was no relationship of any magnitude evident with social desirability, the effect size of the correlation with locus of control, at .231, is in keeping with that reported by others (e.g. Orpen & Jamotte, 1975, report a correlation of .20), and may constitute a replication of the effect. The former result is particularly disappointing given the greater power of study 2.

Taken together, the two studies portray a pessimistic picture of the interrelationship of acceptance with scores on locus of control and social desirability. Neither relationship achieved conventional significance in the two studies, and although each correlation generated an effect size comparable to that found by other researchers (e.g. Snyder & Larson, 1972; Orpen & Jamotte, 1975), the effect was not replicated in the other study in the pair. This reinforces the impression that evidence accrued to date in favour of the effect upon Barnum acceptance of such personality variables is based on relatively small but significant correlations, which may reflect constant but very weak effects. We certainly have no guarantee that these factors play a role in actually inducing the Barnum Effect, although they may play some part in shaping it thereafter. Where a very small effect is detected because of the extra sensitivity of large sample sizes, care must be taken that we do not mistakenly regard a result which is significant to be one which has practical consequences.

We did not replicate the suggestive tendency in study 1 for Ss to better recall those items which had been accepted over those which had not. This may be explained in terms of the introduction of a delay before the surprise recall task which increased the proportion of statements forgotten, so that the effect may have been washed out. Notwithstanding this, the prediction for greater recall of accepted items is rejected here. However, the delay was also successful in generating a greater number of distortions in recall, laying open to scrutiny the predicted effect of acceptance upon the form in which statements are recollected. There was a promising trend for those items which were accepted to suffer more distortion in recall than those that were

less well accepted, which fits well with a model in which the attribution of meaning to a statement causes it to be modified in ways which increase the goodness of fit. The model also suggests a plausible account of the tendency in study 2 for believers in the paranormal to rate the reading as more accurate than disbelievers since the former would be more motivated to expend the cognitive effort necessary to 'make sense' of the statements.

This gives some empirical support to a more positive portrayal of the reader's client as an active problem solver rather than a needful gull. We echo Hyman's (1977) sentiment when he states

> Why does the reading work? And why does it work so well? It does not help to say that people are gullible or suggestible. Nor can we dismiss the findings by implying that some individuals are just not sufficiently discriminating or lack sufficient intelligence to see through the reading. Indeed one can argue that it requires a certain degree of intelligence on the part of a client for the reading to work well. Once the client is actively engaged in trying to make sense of sometimes contradictory statements issuing from the reader, the client becomes a creative problem-solver trying to find coherence and meaning in the total set of statements. The task is not unlike that of trying to make sense of a work of art, a poem, or, for that matter, a sentence. (p. 415).

Given the exploratory nature of the study, it is likely that other interpretations of the findings are possible, and which would need to be considered. One such is that Ss may simply have spent longer considering statements which they felt may have been true of them, so that improved recall may merely reflect greater exposure to those particular messages. This could be investigated by recording the delay between the completion of a message and registering a rating, or controlled for in future replications by placing presentation time within specific limits, under the direction of the computer program which was used in this study.

It is also unfortunate that no attempt was made to counterbalance the favourability of items. As a result, we are unable to rule out the possibility that differential recall may have been due not to the manipulated characteristic but to other attributes of the items themselves, such as topic of concern. Perhaps some issues are inherently more memorable than others. In future replications, it would be informative to vary which items are negatively framed, so that we could be more confident that differential acceptance and recall were due to the manipulated characteristic and not other attributes which could possibly vary across items (such as salience of the topic).

7.10 Chapter summary

This chapter begins by reviewing the experimental literature into the nature and causes of the Barnum Effect, and suggests that in the light of this research, the psychic reading may represent an ideal Barnum context. However, attention was drawn to the dynamic and transitory nature of such interactions, and a portrayal was given of the client as much more active participant than has previously been considered. The cognitive processing artifact hypothesis was proposed to take this characterisation into account when investigating the Barnum Effect. Two studies are described which were designed to assess the merits of the hypothesis relative to the more typical (if implicit) gullibility hypothesis. These studies failed to find evidence of a relationship between acceptance and need for approval and locus of control, as predicted by the latter. Suggestive (but not convincing) support was found for the processing account; study 1 found a tendency for accepted items to be better recalled than rejected items, and study 2 found that where rejected items were recalled, it was

in an unchanged form, whereas accepted items tended to be recalled with some degree of distortion. It is argued that these data are sufficiently promising for the hypothesis to warrant further empirical investigation.

[1] Despite many attempts to determine one, the Barnum effect has stubbornly refused to produce a sex difference in responses over a range of presentation methods (Forer, 1949; Snyder, 1974a, 1977; Marks & Kamman, 1980; Sundberg, 1955; Halperin et al, 1976).

[2] It may be that subjects' perception of the astrologer's competence is associated with the level of specificity of information asked for; one would not expect a very good astrological reading based only on the client's star sign, whereas if they were to ask for specific information about time and place of birth (with the implication that these details will be utilised in the divination) one might be more expectant of a more sophisticated and unique characterisation.

[3] Which is ironic, given that Forer's original statements were chosen from a newsstand book dealing with astrology.

[4] But even here misapprehensions are possible, as evidenced by attempts to 'repair' dissonances in meaning as a dialogue progresses (see e.g. Jefferson, 1987).

[5] This is not to claim that such ambiguities do not occur with written language, but that indexicality is more commonplace with spoken language.

[6] Hyman (1977) cites Asch (1948) as an illuminating example of this process in action. Ss were given the phrase "I hold it that a little rebellion, now and then, is a good thing, and as necessary in the political world as storms are in the physical" which was either attributed to Thomas Jefferson or Vladimir Lenin. Ss reading of the phrase (and thus their level of agreement with its sentiment) was affected by its apparent source, transforming 'rebellion' into 'minor agitation' and 'violent revolution' respectively.

[7] Note: This need not be an especially unique or idiosynchratic interpretation, so long as it confers a sense of the message being 'personal'.

[8] Marks & Kamman (1980: 192) describe an interesting study in which Ss were given a standard feedback list, consisting of an equal mix of Barnum statements and more negative statements. All Ss received the same sketch, but were informed that only marked items applied to them. Half the Ss (the 'Barnum Ss') received sketches with the Barnum items circled, whereas the others ('bad statement Ss') had the negative items circled. All Ss were asked to go through the whole list carefully to indicate the proportions of each type of item which Ss felt *should* have been circled as true of them. The results (given in the table below) indicate that their judgements were strongly affected by their original labelling which perhaps caused them to interpret the statements in a particular way.

	Barnum statements	negative statements
'Barnum Ss'	91%	5%
'bad statement Ss'	16%	50%

[9] Bartlett (1932) starkly illustrates how such material can be recalled in ways which give it more striking personal relevance. Some of the Ss who were asked to memorise the now-classic "War of the Ghosts" folk-tale were men waiting to be called up to fight in the First World War, which seemed to influence their interpretation of the excuses offered by the two men who did not want to fight. Recall emphasised and elaborated on claims made that the men had dependents whom they were responsible for.

[10] Barnum studies have typically made use of Forer's original (1949) thirteen-item statement set, despite their mixed success in inducing acceptance - a trend which was subsequently replicated by Stagner (1958) and Johnson *et al* (1985). Other workers have suggested new source material, and this material was summarised by Weisberg (1970), who rated 70 individual statements consisting of

"revisions or replicas of statements described in ...Forer, 1949, Sundberg, 1955, [and] Marks & Seeman, 1962" (p.744). The items used here were drawn from those presented by Weisberg.

[11] Since this pre-study was conducted prior to the Barnum studies described in Chapters 5 and 6, it also provided the opportunity for first-hand experience of the Barnum effect in operation.

[12] The Tarot deck was restricted here to the major arcana and the court cards of the minor arcana, giving a total of 38 cards. This was done to make the deck more manageable for Ss during shuffling and arranging, and to limit the number of possible choices of card for which a unique interpretation would have to be specifically developed.

[13] This and other ethical considerations were thought to be especially important in the present study, since it involved an element of deception.

[14] The cards were taken from a Vandenborre Bacchus deck. These were selected because the images they portray look both ancient and weighty with symbolism, which should tend to reinforce the authenticity of the reading and emphasise the mysteriousness of the method.

[15] This was to avoid potential problems of subject familiarity with the meanings of some of the cards, which could have preoccupied them during the reading assessment phase.

[16] Data from the "about half and half" category is omitted here because it represents neither acceptance nor rejection of an item, and theoretically is problematic to interpret. In performing a chi-square analysis on the data, one has to make predictions about the expected distribution of ratings should the Barnum Effect not be influential here. There are two main possibilities; either ratings would be evenly distributed across all 5 categories [Weisberg, 1970, assumes that a non-rectangular distribution of ratings across the five point scale constitutes an endorsement of the effect], or else incidence follows a more normal distribution with the more moderate central categories being selected more frequently than more extreme ones. If we remove the central category, and summarise data on either side, then we do not have to discriminate between the two.

[17] The plot is after Baddeley, 1990 (p. 236).

[18] Two subjects who were scheduled to participate late in the study did not attend. It was too late at that point to find replecements before students left for the end of term. It was felt inappropriate to recruit new Ss when students returned as by then details of the protocol are likely to have been leaked.

[19] I should like to thank Ian Upchurch for his assistance with running this part of the study.

Chapter 8: Clients' Influence in the Selection of Elements of a Psychic Reading[1]

8.1 Introduction

8.1.1 Introduction

Informal feedback from subjects in the studies described in Chapter 7 suggested that they could recognise that readings they had solicited had been of a form which allowed them to be true for many people. Yet they remained convinced that some elements of the reading were especially true of them or their circumstances in a manner which made the reading particularly or even uniquely pertinent to them.

It is not easy to reconcile this impression with the findings of experimental studies of psychic readers (most notably Boerenkamp, 1985, 1986) which argue that psychics draw from a pre-formed array of 'things to say'. This impression is buttressed by the extensive pseudopsychic literature (e.g. Hobrin,1990; Jones, 1990) which serves to provide just such a set of reading elements. The array needs to be large and comprehensive enough in range to cover most eventualities (in terms of personality, concerns, events) in clients' lives, but nevertheless must be brief enough to be memorised and recalled by the reader with only limited *aides memoire* to hand[2]. Indeed, the memorial demands made of the reader are likely to lead to a tendency for the same topics to recur quite frequently, subject to the preferential biases of the reader. Boerenkamp's (1988) account of the behaviour of the claimants that he tested may be seen as describing such a tendency:

> [the] psychics appeared to be very consistent in their behaviour. Each psychic had a preference for a session of a certain duration... The psychics appeared also to be consistent in most characteristics of the structural analysis. Each of them had a personal preference for certain topics ... [etc] ...The target person and his or her specific circumstances in life hardly affects the structure of the verbal behaviour of the psychics. (pp. 146-147).

According to this interpretation, the readings generated do not depend upon the reader sensing unique aspects of the client's life and concerns, but rather upon the client's willingness to interpret and elaborate upon the limited information mechanically generated by the reader[3]. Explanations of this process typically invoke the Barnum Effect (Hyman, 1977; Roe, 1991), which emphasises the vague or general nature of the statements in allowing the client to read their own meaning into them, as well as focussing upon characteristics of the client which leave them especially vulnerable to such deception (e.g. Tyson, 1982) . The client's erroneous impression that others would not fit their given description can be accounted for in terms of their limited access to a comparable array of others' life experiences against which to match the information (Tversky & Kahneman, 1973, term this the *availability heuristic*). There can be little doubt that this proposed solution in terms of conventional psychology is coherent and somewhat persuasive.

However, if we consider what kind of information we should expect were the reader to be *genuine* - that is, if his material was derived paranormally - it seems likely that he would be strait-jacketed by many of the same factors that underscore the conventional account. Despite being convinced of their own uniqueness, people *are* actually very similar to one another[4]; they tend to experience comparable events at the same stages in their lives, to focus on similar current problems, and to hold

similar aspirations for the future (See Sugarman, 1986, for an overview of the psychological literature pertaining to this point). Perhaps it should not be surprising, then, that after investigating a reader for an extended period of time the readings start to appear formulaic. We cannot take this as evidence of conscious deception any more than we can assume that a GP is diagnosing patients through the application of some probabilistic algorithm rather than in response to their needs, simply because many of the diagnoses reappear with great regularity. On the contrary, it seems to be this kind of ability to find similarities and analogies between current and past experiences which differentiates the expert from the novice in any given domain (cf. Mayer, 1983). Indeed, it may be informative to consider the successful psychic reader to share some of the properties of expert systems generally. Such a characterisation offers some predictions about the reader's behaviour;

(i) *There is a specifiable domain of expertise.* In the case of a medical expert system, this would cover the range of possible illnesses or abnormalities that have thus far been encountered and described. For the reader, this expertise lies in part in the domain of what has been called 'life-span development', and covers the range of major social and psychological life events usually (or relatively often) encountered in the course of living and ageing, both in terms of the general trend and also in the variations on that theme (i.e. individual differences) shown by different sub-groups (see Sheehy, 1976, for an account).

(ii) *The expert utilises a pre-existing database developed through tuition and experience*. It seems reasonable to suppose that, just as the medical expert system is supplied with a pool of symptom-diagnosis relationships, so the reader may develop, through experience, a lexicon of descriptors with which he is able to characterise the majority of individuals who seek his advice. Via overt tuition or, more commonly, through personal interaction with clients, the reader has the opportunity to learn (perhaps at an unconscious level) of those ways which are most successful and parsimonious in segmenting the clients' needs into meaningful categories, and in determining which of those are most appropriate to particular sub-groups that present themselves. As with expert systems generally, some aspects of the reader's expertise will be common to all, whereas other aspects will be more idiosyncratic.

(iii) *When presented with particular symptoms, the expert system selects the most appropriate diagnosis (or diagnoses) from those in the pool.* For the medical expert system, the task is completed successfully when an accurate diagnosis is reached. Similarly, the reader's success is gauged by the accuracy with which chosen descriptors reflect the client's perception of her circumstances. Such successful selection of items from the pool may be explicable merely in terms of pigeon-holing the client on the basis of information available to the reader through normal communication channels, such as non-verbal leakage (see Chapter 4). Naturally, different levels of accuracy of description are possible,

depending upon the specificity of the information unwittingly supplied by the client.

Alternatively, we could speculate that this selection process provides a point of randomness or uncertainty at which psi could be effective; directing the unconscious to the more appropriate items. This process is reminiscent of memory theories of psi (Roll, 1966; Irwin, 1979) in suggesting that psychic impressions may consist of pre-existing memory traces which have been artificially revived in some way. There is some indirect support for such a model (e.g. Kanthamani & Rao, 1975), although there have also been a number of failures to find predicted relationships between ESP and memorial performance (e.g. Blackmore, 1980a, 1980b).

A variant of this interpretation suggests that it is the client herself who uses psi, in the form of PK to direct the reader's choice of statement so as to achieve certain desirable objectives (such as evoking independent affirmation of the correctness of difficult decisions they have to make). By allowing such a mechanism, in which the reader can influence the selection of pre-existing reading elements, we are offered a means to resolve the apparent paradox between some parapsychologists' description of psychic readings as formulaic (since this is a characteristic of the database) and clients' high level of acceptance (which would be a function of the selection process)[5]. In proposing a PK element to the interaction, we do not intend to preclude the possibility that ESP may also be functioning here, since both processes could be acting concurrently. Rather, we wish only to draw attention to the possibility that the

client may play a more active role in the exchange. But for this to be plausible, it needs to be shown that under certain circumstances, people *are* able to have a remote influence upon others - either physiologically or behaviourally - in such a way as to provide a precedent for remote influence of statement selections.

8.1.2 The psychic reader as a potentially influenceable system

8.1.2.1 Remote influence upon biological systems

There is some evidence to suggest that individuals are able to successfully influence the physiology, behaviour or mental state of others situated at a distant location. One notable instance is in the realm of psychic healing (see Schouten, 1993, for a review of research). As an experimental analogue of the healing paradigm, research on the direct mental interaction with living systems (DMILS) has found that Ss are able to have effects upon a variety of physiological and behavioural parameters (e.g. Delanoy & Sah, 1994). Braud & Schlitz (1991) have reported on an extended series of experiments conducted over 13 years, which considered physiological and behavioural effects upon diverse biological systems, including another person's electrodermal activity, blood pressure, and muscular activity; the spatial orientation of fish; the locomotor activity of small mammals; and the rate of haemolysis of human red blood cells. Of 37 experiments conducted, 21 yielded independently significant results. In attempting to identify conducive characteristics of the system to be influenced, they found that

> animate target systems are inherently more susceptible to direct mental influence than are inanimate systems .... *Labile systems may be more susceptible to DMI than are more inert systems.* It is not yet known whether physical lability itself or perceived lability is the

> critical factor ... freely varying activity may reflect underlying randomness (or, perhaps, chaotic activity) which may be essential to the occurrence of direct mental effects. (p.3, emphasis mine).

Such influence may not be restricted to physical systems. Braud (1994) has posed the question

> If biological systems are indeed more susceptible or 'sensitive' to direct mental influence than are inanimate systems, might not *psychological* systems be still more sensitive? ... It is indeed possible to consider the variety of *anomalous cognition* effects typically referred to as extrasensory perception, telepathy, clairvoyance and precognition as special instances of the influence of consciousness upon the physical world; in these cases, the physical 'targets' happen to be neural activities, behaviours, thoughts, images and feelings of another person. (pp. 69-70, emphasis in original)

In this vein, Braud & Jackson (1983) have found that influencers were able to affect the 'intensity' of mental imagery of another person at a distant location. Further, in conventional ESP research, a number of authors have found better performance to occur when a sender or agent was involved than when clairvoyance alone was possible (Bierman & Camstra, 1973; Klein, 1972), suggesting that the agent is able to actively direct the subject's mentation or choice of target in some way. These results are compromised, however, by percipients knowing whether or not a sender would be present, so that any differences in performance may be a simple psychological effect. Studies which have controlled for this have given mixed results (see Morris et al., 1995; Williams et al., 1994).

The role of sender was considered more directly by Kreitler & Kreitler (1973), who found that trials on which the sender was actively sending the target information yielded significantly higher ESP scores than those on which they simply thought about the target. Schmeidler (1961) found suggestive support for differential

percipient performance between clairvoyance and GESP trials, and interestingly also reported better scoring in clairvoyance when a 'sender' was instructed to wish for a positive outcome than when they were to wish for the trial to be a failure. This relationship could be further clarified if variables associated with the sender could be seen to covary with ESP success at a particular task. To date, research has concentrated on the level of acquaintance between agent and subject (e.g. Broughton & Alexander, 1995). Although this suggests that the agent-subject relationship can act as a moderator variable for the generation of above-chance results (e.g. Beer, 1971, but see also Caspar, 1952), this may simply be a psychological factor, since in all cases the subject knew who would be acting as sender. Similarly, Schmeidler (1961) reported some success in attempting to predict the performance of agent-percipient pairs on a GESP trial according to 'compatibility' estimates based on Rorschach responses.

If the percipient's decision-making process represents a sufficiently labile cognitive system, then the sender may be able to effect some influence upon that process. Similarly, the psychic reader may be guided to some degree by the client. And since the effect appears to occur in a 'goal-directed' manner, without the influencer needing to understand or even be aware of the specific physiological and psychological processes which bring about the desired outcome (Braud & Schlitz, 1991, p.41) the complexity of the cognitive system to be influenced need not be a bar to success. Intentionality appears to be the key factor in effecting these changes,

so that maintaining a strong intention of a desired goal event is more important than understanding the processes that lead to it.

8.1.2.2 Parallel effects with electronic systems

As an initial step in modelling the psychic reader as an influenceable system, it may be useful to construct a simplified computer-based statement selector to act as 'reader', so as to minimise the confounding influence of any extraneous factors associated with a 'live' reader. It would also allow us to utilise a simulated psychic reading protocol that had already been developed (Chapter 7). The replacement of a live reader with an electronic counterpart may be considered valid if we can be confident that effects similar to those outlined above are possible when attempting to influence non-biological systems. And indeed there is good evidence to suggest firstly that individuals are able to exert a consistent influence upon non-biological systems - albeit producing a much weaker effect - both at the microscopic level of REG output (Radin & Nelson, 1989) and at the macroscopic level of dice rolling (Radin & Ferrari, 1991) and random mechanical cascades (Dunne et al., 1991).

Secondly, it seems that subject influence upon remote physical systems shares many of the attributes of DMILS. For example, it is characteristic of such interactions that the psi process appears to be intrinsically goal directed and acts independently of task complexity (cf. Kennedy, 1978; Schmidt 1974, 1975a), even to the extent that the subject need not be aware that the task requires their remote influencing of a

target system (Schmidt, 1975b; Stanford et al., 1975), whereas it does seem to depend upon the degree of free variability in the target system.

This latter has been explored in William Braud's ALGERNON study (Braud and Schroeter, 1983)[6]. Braud's BASIC program held 512 brief but meaningful statements selected from various sources. Ss typed a series of 16 freely chosen questions via a keyboard and received a response selected randomly by the computer. Four conditions were considered, varying in the lability of the selection vehicle: a radioactivity-based random generator, a pseudo-random algorithm seeded 16 times, the same algorithm seeded once, and a pre-determined set. It was hypothesized that more labile (characterised by free variability) selection processes would be more susceptible to ESP than more inert (or deterministic) processes. They found that perceived meaningfulness of computer responses increased with the lability of the selection procedure, although this trend failed to achieve significance.

8.1.3 The pseudo-reading as a context for studies of PK

We may thus feel reasonably confident in using a computer-based REG as a substitute for a 'live' target system when assessing the client-as-agent account of successful readings. However, even if the proposed mechanism for the action of PK in actual psychic readings is found to be invalid, there are other potential advantages in embedding a PK task in what is ostensibly a psychic reading. Covert PK tasks have enjoyed some success previously (e.g. Stanford et al., 1975), perhaps in part because they avoid the build-up of psychological resistance which some Ss feel in

relation to their own posited PK abilities. They may also be considered to be more ecologically valid since they retain ties with Ss' actual needs, and as such provide a better platform from which to evaluate the more ecologically-based theories of psi such as Stanford's PMIR and CBM models[7]. At the level of a straightforward PK task, it should be informative to consider some of the variables which have previously been associated with above chance performance.

8.1.3.1 PK and demographics

There have been disappointingly few assessments of the effects of attitude or motivation upon PK performance. Gissurarson & Morris (1991) note that "the sheep-goat classification does not seem to have been adequately tested for PK. The results so far are ambiguous, the reports are sketchy, and the number of subjects participating is low" (p. 123). They attempted to begin redressing this imbalance by developing the PK attitude and perceived experience questionnaire (PAPEQ), which represented a broad range of attitudinal variables covering a number of distinct factors. These factors endured mixed success as predictors of PK performance, although Gissurarson and Morris considered measures concerned with a general sheep-goat attitude toward PK, perceived success, and PK experience to be of most promise. However, it should be noted that much of the promise is derived from the relatively high correlations found in studies 1 to 3 of the 5-study series, which are based on very small sample sizes. Study 5, working with a larger n failed to find any reliable predictors of PK performance. The dependence on low n studies is evident from Gissurarson's (1990/1) estimate of r based on all PK sheep-goat studies

weighted by n which gives a positive but non-significant relationship ($r = .10$, $p = .08$). This trend towards non-significance with higher power studies may also be seen in three studies not included in Gissurarson's review: Troscianko & Blackmore (1983) failed to discern a sheep-goat effect with a sample of 100 Ss, von Lucadou (1987a) similarly found no evidence for a relationship between belief and performance with 299 Ss, whereas Berger (1988) found in post hoc analyses of only 10 Ss that higher scores were produced by Ss with stronger belief in psi. However, von Lucadou (1987a) did report a positive correlation between performance and 'confidence' ratings, a measure which is reminiscent of Schmeidler's (1943) criterion 1, and which von Lucadou suggested "could be perceived as a kind of sheep-goat variable" (p. 413). Also Morris et al. (1993) have recently reported on a three-study series considering sheep-goat effects in the performance of 125Ss at a PK game, which did find a significant overall tendency for sheep to outperform goats. Further work is recommended here.

Subject motivation has been linked to PK decline effects (e.g. Schmeidler, 1987), and was the impetus for the development of PK tasks in the form of engaging games (e.g. Beloff et al. 1978; Broughton & Perlstrom, 1986). It is too early to say whether this approach has been successful in enhancing subject scoring, especially since the game environment is often still relatively artificial and may not be as absorbing for subjects as is hoped. With increasing availability of sophisticated computing equipment, there is the opportunity to develop game contexts which more successfully reflect subjects' motivations and needs.

The effects of personality type upon PK performance have also been under-investigated, especially given that a number of researchers have argued for the existence of 'psychic signatures' (which may be of psychological or physical origin) in PK action (Babu, 1987; Radin, 1989), while others (e.g. Nelson & Dobyns, 1989) have found evidence for individual differences in preferred intentions in PK tasks. Schmidt & Schlitz (1989) have found more successful PK performance with Ss who scored highly on MBTI scales of feeling and perceiving, replicating the effect found in the very different setting of ganzfeld ESP (Honorton & Schechter, 1986). However, this study investigated retro-PK, using mailed prerecorded tapes as targets, and the relationship between this type of effect and real-time psychokinesis is unclear. This promising finding warrants further consideration. Berger et al. (1986) also report that feeling types generated higher effect sizes (though not necessarily better 'hitting') than thinking types in real-time tasks involving the PK games Invaders and PsiBall as well as in silent REG trials.

8.1.3.2 PK and geomagnetism

There is a growing line of research which suggests that ESP performance is related to fluctuations in the Earth's geomagnetic field (e.g. Makarec & Persinger, 1987; Persinger, 1985; Radin et al. 1994), with stronger effects being associated with field quiescence. Persinger (1989) has proposed a plausible mechanism for this effect in terms of the moderation of temporal lobe activity. Fewer studies have considered the effects of geophysical changes upon PK performance, but Braud and Dennis (1989)

have proposed that the relationship is reversed, with performance being enhanced at times of high activity. This is in keeping with the claim made by a number of theoretical models of psi functioning (e.g.., Braud, 1981; Roll, 1985; Stanford, 1978) that optimal conditions for PK are complementary to those for ESP. Thus if PK rather than ESP is the causative factor in generating accurate psychic readings, then greater accuracy should be associated with high rather than low geomagnetic flux.

The usual measure of geomagnetic activity is the antipodal averages (aa) index, which is a global estimate (see e.g. Persinger, 1989). However, a case has been made by Williams et al. (1993) for using more local F values where they are available, since they promise to give a more accurate portrayal of prevailing geomagnetic conditions than is offered by a global measure, and this latter is preferred here.

8.1.4 The present study

The present study is a test of the suggestion that the selection of statements on the basis of REG output is an analogue of the psychic reader's selection process, so that if Ss are given the opportunity they will influence the (in this case REG) selection of reading elements to focus upon those which best address their own needs. It adopts a design which constitutes a partial replication of Braud's ALGERNON study (Braud and Schroeter, 1983), but with Ss under the misbelief that their reading is being produced by a human agent. It may also be considered to be a covert PK study in a novel setting, and as such attempts to replicate the effects of personality (in terms of

Jungian personality types) and attitude (PAPEQ) factors, as well as geomagnetic activity upon PK success.

8.1.5 Hypotheses

All predictions were planned, and 1-tailed unless otherwise indicated. Primary hypotheses are emboldened.

H_1: Statements selected by the REG source will be rated as more accurate than those pre-selected by random number tables. [This is termed *task success*].

H_2: The greater Ss' initial belief in psi, the greater will be their task success.

H_3: Ss' scores on the sub-scale measuring attitude toward PK will covary positively with task success.

H_4: Ss' scores on the sub-scale measuring perceived success (as defined by Gissurarson & Morris, 1991) will covary positively with task success.

H_5: Ss' scores on the sub-scale measuring experience of PK will covary positively with task success.

H_6: Ss' who are typed as feeling by the Keirsey Temperament Sorter will exhibit greater task success than will thinking types.

H_7: Ss' who are typed as perceiving on the Keirsey Temperament Sorter will exhibit greater task success than will judging types.

H_8: There will be differential task success for extravert versus introvert types as identified by the Keirsey Temperament Sorter (2-tailed).

H_9: There will be differential task success for sensing versus intuiting types as identified by the Keirsey Temperament Sorter (2-tailed).

H_{10}: Task success will covary positively with geomagnetic activity.

8.2 Method

8.2.1 Subjects

Twenty-seven Psychology undergraduates at the University of Edinburgh were recruited by E during tutorial classes, and consisted of 5 males and 22 females in the age range 18-41 years. Ss were drawn from junior honours years to ensure that they would not have been previously exposed to research of this type. Ss were presented with the sham protocol that they were needed to act as clients to help evaluate the information generated by a psychic claimant who professed expertise with Tarot cards. It was explained that they would interact with the reader (R) via a computer link so as to reduce the possibility of normal sensory leakage.

8.2.2 Materials

8.2.2.1 Randomness source

The REG consisted of two independent analogue Zener diode based noise sources[8], with both signals converted into random bit streams, combined and subsequently transmitted in the form of bytes to the RS-232 port of an IBM 286 pc. The pc was programmed in BASIC[9]. Prior to running the study, the REG output was tested for randomness[10]. These tests suggested that the REG did not exhibit any systematic trends or covariations in output beyond those that could be expected by chance. A full list of the results of analyses are included as an appendix.

8.2.2.2 Statement pool

A statement pool developed for the studies described in Chapters 6 and 7, drawing from a number of sources, and consisting of 75 Barnum statements, was adopted here. Control statements for each S were selected from this pool prior to commencement of the study using random number tables (RAND, 1955). An entry point to the list was determined by E using the RND function of a Casio fx-100 scientific calculator to give the page number, the row, and the item along that row at which to begin the series. All numbers in that series with values between 1 and 75 were taken to generate a single list sufficiently long to cover all Ss in the study. These data were arranged in a 10x40 array, with each row containing the pre-selected statement numbers for a single subject. Numbers which were repeated in any given row were deleted with subsequent numbers promoted by one place.

8.2.2.3 Measures of individual differences

Attitude and belief variables were measured using a Belief In Paranormal (BIP) questionnaire, consisting of an adapted version of Thalbourne's revised Australian scale (Thalbourne & Delin, 1993). Thalbourne's visual analogue scale was replaced by a 5-point Likert scale, which represents a standard form of presentation for questionnaire items that is easier to interpret (cf. Kline, 1994). Items in the battery were selected to represent Gissurarson & Morris' (1991) factors, with items 14, 15 & 16 representing attitude towards PK (F1), items 17 and 18 measuring experience of PK (F6), and item 19 indicating perceived self success (Q5). Further items (20 to 23) were added to gauge Ss' previous experience of psychic readers and the degree to

which they have been impressed by the content of such readings. A copy of the questionnaire is included as an appendix.

The MBTI could not be used here to type Ss, since the test is subject to relatively high licensing fees, which exceed the resources available for this study, and so the Keirsey Temperament Sorter (KTS) (Keirsey & Bates, 1978) was adopted as a replacement. This is essentially an abbreviated version of the MBTI, but is freely available, for example via the internet. The test has high validity, consisting mainly of rewordings of MBTI items, and has been found to be acceptably reliable. Quinn et al. (1992), for example, recommend that "counsellors and faculty could use the Keirsey Temperament sorter instead of the MBTI under conditions for which cost and ease of administration are important factors" (p. 280).

8.2.3 Procedure

Prior to the session, Ss completed the BIP and KTS measures, ostensibly to aid E in independently evaluating the reading. At the session itself, S was shown to a cubicle containing a computer terminal. After an initial chat with E to aquaint them with the format of the study, Ss generated a Tarot card spread, placing cards *face down and without looking at them* on a 24" x 18" green baize-covered 'portable table'. Once the arrangement was complete, E removed the table along with unused cards, ostensibly to transport them to R. Upon E's departure, S would sit at the terminal and wait for R to interpret the arrangement and start to relay any impressions formed. There was a

delay before the reading began, primarily to give S the impression that the reader was considering the arrangement of cards.

Each reading consisted of 20 items. Ten of these (the experimental items) were selected by repeated sampling of the REG in real time, whereas ten (the controls) were taken from the pre-determined pseudo-random list. For experimental items, the REG would be sampled during the reading to select a number between 1 and 75 which corresponded with one of the statements in the pool. A check was made to ensure that selections were not already included in the pseudo-random list to prevent the same statement appearing twice in a reading. Where the selection *was* found in the pseudo-random list, the REG was re-sampled and the item flagged so that although it would still be presented as a control item, it would not be included in later analyses (since it was effectively a member of both conditions and thus problematic to interpret). Where a statement was selected more than once by the REG over the course of a single reading, it would also be resampled, and the item flagged to allow post-hoc analysis of the performance of statements to which they referred. During the course of the reading, the REG was also sampled to generate twenty 'dummy items', to provide control data against which to test the randomness of the selection procedure.

Randomly and pseudo-randomly generated statements were presented alternately, with half the Ss receiving the former type first, and half receiving the latter type first. Items were presented to Ss as if typed letter by letter. To add realism to the

ostensible communication, subroutines were used in the program to make the presentation look more like human typing; a random length delay (between 0.15 and 1.5 seconds) was introduced between the typing of letters, and when encountering certain common letters, there was a 1 in 10 likelihood that an adjacent letter would be 'typed' instead (which would then be deleted and replaced with the correct letter). A question mark would be typed to indicate that a message was complete. Ss then rated that statement for accuracy using a 5-point scale, after Carrier (1963), where 1 = "amazingly accurate", 2 = "rather good", 3 = "about half and half", 4 = "more wrong than right", and 5 = "almost entirely wrong". and registered their rating via the computer keyboard. After a rating had been registered, that message would disappear from the screen.

Once the statement list was exhausted, Ss received a message on-screen from R which indicated that the reading was over. Data sets were recorded to computer hard disk and to a $3^1/_2$" floppy disk as backup. This contained information about Ss' name and number in the series, the list of items selected, their order of presentation, and Ss' ratings of them, as well as noting any items selected more than once.

Immediately after the reading, which typically lasted between 25 and 35 minutes, Ss were given an extensive debrief, explaining the reasons for the protocol design, and the necessity for the deception in particular. Interestingly, only one subject suspected that the study may not have been as described on recruitment (and she did not expect there to be no reader at all, but believed that the reader may give a reading opposite

to that indicated by the cards). All the subjects were known to the experimenter before the study, and this may have contributed to their willingness to accept at face value the original account of the study.

8.3 Results

8.3.1 Within-study tests of randomness

The randomness of the REG selection procedure was tested by comparing the observed selections for 'dummy items' against an expected equal distribution across all 75 choices. No bias towards certain selections over others was evident [X^2 = 60.833, 74df, p = 0.864].

8.3.2 PK task performance

To control for individual differences in Ss' acceptance of reading items, a PK ratio score was calculated for each subject using the formula[11] :

$$\text{PK ratio} = \frac{\text{mean rating for REG items}}{(\text{mean rating for REG items}) + (\text{mean rating for control items})}$$

This gives ratios in the range 0 to 1, with a value of 0.5 indicating that Ss gave similar ratings to both types of item (i.e. in support of the null hypothesis). Since lower ratings for statements (i.e. 1 or 2) indicate *greater* acceptance, ratios of less than 0.5 indicate that Ss rated the REG items as being more accurate than control

items. Ratios for each individual were calculated from raw scores by E, and checked by an independent judge who was blind to the purpose of the study. Figure 8.1 shows the distribution of PK ratio scores:

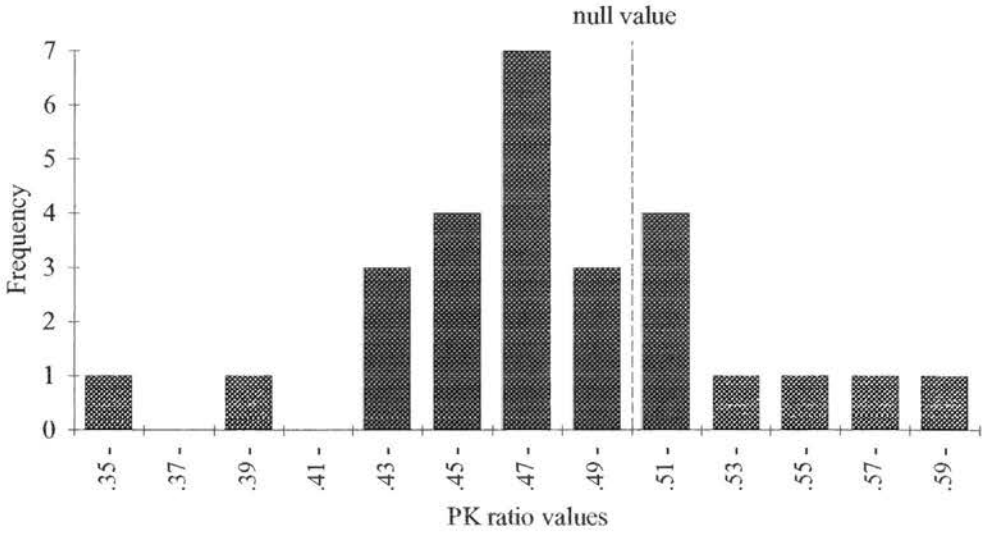


Figure 8.1: Frequency distribution of Ss' PK ratio values

The plot shows a relatively normal distribution, but with the mid-point displaced to the left of the null value of 0.5 (evident in a mean of 0.487), which suggests that Ss did prefer REG items to control items. The normal distribution implies that the effect is not due to the greater influence of outliers, but rather is due to a general trend in the data. Although this trend does not achieve significance [t = -1.333, p = .097, 1-tail], it generates a reasonable effect size, r, of 0.257 (calculated as t / root n, after Rosenthal & Rosnow, 1991, p. 292). Of the 27 ratio scores, 19 give values below 0.5

whereas only 8 show the reverse trend, a binomial distribution which post hoc is significant (p = .027).

8.3.3 Acceptance of repeatedly-selected items

It is plausible that items that have been '*selected*' twice or more by the REG in any single reading (although of course they would only have been *presented* once) have been subject to greater 'selection pressure', in a manner which may be not unlike the majority vote method (see Palmer, 1986b, p. 144 for a description of this procedure). Ratings for these items were compared post hoc with those for REG items selected only once. The ratio measure used in section 8.3.2 was applied here, to generate a within subjects measure, so that:

$$\text{PK ratio} = \frac{\text{mean rating for REPEAT items}}{(\text{mean rating for REPEAT items}) + (\text{mean rating for SINGLE items})}$$

Ss whose reading did not generate repeats were omitted to leave a sample of 20. Values less than 0.5 indicate a preference for the statements selected repeatedly over those selected only once. Although the trend is again in the predicted direction, generating a mean of 0.483, the deviation from the null of 0.5 is not significant [t = -0.693, p = .248, 1-tail]. The associated effect size is 0.155.

On two occasions an item was selected more than twice. In both cases, the statement was given a rating of 1 ("amazingly accurate"). For comparison, 66 of the 239

singly-selected REG items (or 1 in 4), and 7 of 29 doubly-selected items (also approx 1 in 4) were given a rating of 1.

8.3.4 Covariance of performance with attitude and belief measures.

Personality data for the final three participants was lost during the relocation of some record sheets. These individuals could not be re-contacted to provide replacement data. Analyses here are for the 24 Ss for whom we have complete data.

A mean psi belief score was calculated for each S using all items from the Australian scale. A measure of their attitude to PK was taken by calculating Ss' total score for the items 14, 15 and 16. Experience of PK was assessed by totalling scores on items 17 and 18, and for perceived success item 19 was used. The results of comparisons of these values with task performance in terms of Spearman's Rho is given in Table 8.1.

	PK ratio	prob. (1-tail)
general belief in psi	- 0.031	0.440
attitude to PK	0.075	0.360
experience of PK	- 0.227	0.138
perceived success	- 0.014	0.474
belief in Tarot	0.253	0.112
Tarot experience	- 0.076	0.716

Table 8.1: Correlation of PK ratio score with belief and attitude measures.

The data has been organised so that positive correlations indicate a positive relationship between each attitude or belief and PK performance, the direction of relationship predicted between each variable and performance.

Applying the Bonferroni correction for multiple analyses sets the alpha at 0.008. On this basis, none of the experimental hypotheses has been supported. Two weak relationships may be of note; with experience of PK, where (contrary to hypothesis) non-experiencers performed better at the experimental task, and with belief in Tarot where believers performed better than non-believers at the task, although both trends are well within the range expected by chance and too much should not be made of them.

8.3.5 Covariance of performance with KTS scores.

Ss were typed along the four dimensions of the Temperament Sorter as outlined by Keirsey & Bates (1984). Where Ss showed no preference for either of the types on a particular dimension, they were typed 'X' and omitted from that analysis. Personality data is summarised in Figure 8.2:

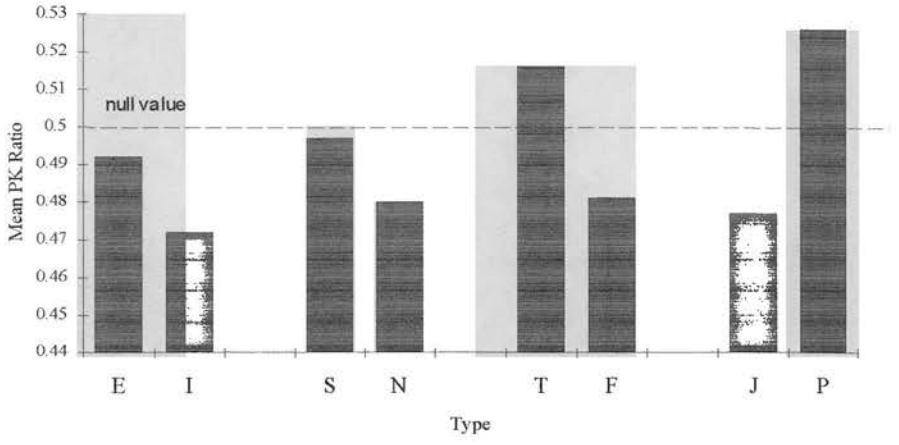


Figure 8.2: Mean PK ratios by personality type

These data should be treated with some caution, since some personality categories contain as few as four or five persons[12]. However, it is interesting to note that, as predicted, feeling types did generate lower PK ratios than did thinking types, although this was not to a significant degree [U = 23.5, p = .120, 1-tail]. Surprisingly, judging types were superior at this task to perceiving types, which is in contrast to the predicted relationship [U = 22, p = .054, but not sig., since 1-tail]. Neither the dimension of intuition nor of extraversion appeared to be related to Ss' performance at the task [U = 29, p = .465, 2-tail, and U = 36.5, p = .419, 2-tail respectively].

8.3.6 Covariance of performance with geomagnetic flux.

Local measures of geomagnetic activity, measured in F (nT) at three-hourly intervals were obtained from Eskdalemuir meteorological station. This site is less than 50 miles away from the site of the study and so can be considered to be an accurate

gauge of prevailing geomagnetic conditions. By this measure, there was no relationship between geo and PK performance in this task [$r^2 = 1.413 \times 10^{-5}$, ns].

8.4 Discussion

The study's findings are similar to those of Braud & Schroeter (1983) in that perceived meaningfulness (or accuracy) of feedback was greater with a more labile selection procedure. The effect may best be described in terms of a goal-oriented PK effect, in which Ss interacted with the REG to cause the reading to more closely deal with issues or concerns which were pertinent to them. This may provide some encouragement for the client-as-agent characterisation of the psychic reading, and certainly seems to be sufficiently promising to warrant further evaluation and elaboration. One extension of the model, for example, suggests that 'successful' readers are likely to be predisposed in some way to be especially open to the influence of others. It would be interesting to see how such readers fared as influencees in DMILS settings such as used in staring studies (e.g. Radin et al., 1993).

As a covert PK task, the study gave rise to a suggestive but ultimately non-significant tendency for Ss to regard REG generated items as more applicable to their circumstances than controls selected using random number tables[13]. However, the effect size of 0.257 compares quite favourably with those typical of other REG-based studies, estimated by Radin & Nelson (1989) at 3×10^{-4} , and in fact is more in keeping with those associated with the DMILS protocol, estimated at 0.33

(Braud & Schlitz, 1991)[14]. This enhanced REG effect could be attributable to the greater emphasis on generating a valid test environment; one in which psi might be expected to naturally occur. By adopting a context which provides a plausible intentional focus and which generates a meaningful product, the protocol may more obviously bear upon Ss' actual needs and motivations. Rather than representing psychological variables which could act as confounds in experimental studies, it may be that these factors are central to the action of psi in the real world; providing the impetus for the action of psi, shaping the form that such action takes, and leading to the attribution (or recognition) of meaningfulness in their consequences.

It should be noted, however, that the study design does not preclude the possibility that any effect is a result not of PK but of a combination of Ss' ESP and demand characteristics. In this latter case, it could be suggested that Ss become aware of the different 'sources' for the two statement sets, and that they are also aware at some level of E's expectations for the study so that demand characteristics can take effect. This account, although perhaps equally plausible in terms of claimed anomalous information exchange, is passed over at this time in preference for the PK account on the grounds of parsimony; it invokes a 3-stage process of awareness of statement types, as well as awareness of E's expectation, and the action of demand characteristics, which contrasts with the two stages of unconscious selection of appropriate statements, and then the conscious rating of same.

For belief attitude measures, none of the experimental hypotheses have been supported. However, given the relatively low power of the study, one or two of the relationships could be retained as suggestive and worthy of further work. In particular, Ss who indicated that they believed that the Tarot could provide insight into their condition did tend to have a greater effect upon the accuracy of REG items relative to controls. It was also surprising to note the, admittedly weak, negative correlation between PK experience and task success here. The PK element of this study was covert and may have appealed more to those who would shy away from more direct confrontation with such phenomena. It is interesting to note that Berger (1988) has reported an inverse relationship between psi experience and effects on silent run scores, which could be regarded as somewhat analogous to the present task.

The failure to replicate Gissurarson & Morris's (1991) detection of a sheep-goat effect related to attitude towards PK and performance on a PK task is disappointing. This may be due to differences in the measure of belief, but this seems unlikely given that both sets of items are so similar in form. Perhaps more importantly, previous work has focussed on overt PK tests, where S may be more motivated to generate results which conform to their prior beliefs and expectations. In this respect, we might expect Ss' attitudes towards Tarot reading to be a better predictor of task performance than an ostensibly irrelevant measure of belief in PK.

In terms of personality attributes of successful Ss, there was a non-significant tendency for feeling types to perform better than thinking types. Failure to achieve conventional significance may be attributable to the relatively low power of this study, and further replication is recommended. It is perhaps surprising to note the better task performance associated with judging types over perceiving types, which runs contrary to prediction. Keirsey & Bates (1978) describe the former personality as made up of persons who prefer closure when decisions are pending, and who feel most comfortable when choices have been made. In contrast, the perceiving type experiences resistance when asked to make decisions, prefering to leave their options open indefinitely. With such a characterisation, it may be the case that the psychic reading context provides a better vehicle for the judging type, as it expressly offers the opportunity for decisions to be made. It would be interesting to see if this finding is replicated with this or similar protocols.

8.5 Chapter summary

This Chapter describes a study designed to test the suggestion that clients of psychic readings may be able to remotely influence the reader's choice of elements for their reading in a manner analogous to other DMILS effects. 27Ss were recruited to act as clients in an 'assessment of a psychic claimant', and received readings transmitted via a computer linkup. However, there was no claimant. Instead, reading elements were selected from a pool of 75 items. Each reading of 20 statements consisted of half selected in real time via a live REG (the experimental items) and half using a pre-selected list derived using random number tables (control items). Ss rated each

element for accuracy. REG-selected items were rated by Ss as more accurate than control items, although this was not to a significant degree. 'Success' in item selection was not related to belief or attitude variables. As predicted, feeling types were superior at the task to perceiving types, but not significantly so. Other predictions based on Jungian personality types were not supported. It is suggested that although the study failed to elicit effects that achieved conventional significance, the effect sizes reported are of a very reasonable magnitude for REG-based studies. Further work is recommended.

[1] A version of this chapter has been accepted for publication in the Journal of Parapsychology (Roe, 1995c). I would like to thank Robert Morris, Caroline Watt, Harvey Irwin and two anonymous reviewers for helpful comments on earlier drafts of this paper.

[2] Most obviously, meanings can be organised according to the principles of the divinatory process espoused so that, for example, certain Tarot cards suggest certain interpretations.

[3] In this work, I'm not concerned with those instances of dramatically correct or insightful readings given by readers - they would provide data which would be much more straightforward to evaluate. Indeed, should such readings occur under controlled conditions, it would provide persuasive experimental evidence for anomalous information transfer. Unfortunately, such evidence has not been forthcoming in contemporary investigations (see Schouten, 1993, for a review).

[4] This is not to deny, of course, that people differ very much from one another with respect to the detail of their lives, but suggests that the kinds of issues for which they typically visit a psychic (i.e. the core fundamental issues) are more likely to fall into common categories.

[5] Of course, it may be that the apparent paradox is explained simply in terms of the Barnum effect.

[6] The design this study was inspired by the program ALICE that originated at Maimonides and had been further developed at PRL. Despite the program being fairly well known among parapsychologists, it seems not to have formed the basis of any formal experiments, although Mario Varvoglis did include an interaction with ALICE as a warmup for Ss who participated in a PK/REG study (McCarthy, personal communication, 1994).

[7] See Stanford (1990) for an extensive re-appraisal of Psi-mediated Instrumental Response, and Stanford (1978) for an account of the Conformance Behaviour Model. This approach is also sympathetic to the notion of pragmatic information, as forwarded by von Lucadou (1987b).

[8] Further specification details can be supplied on request by Professor Dick Bierman, Psychology Department, University of Amsterdam, Holland.

[9] Thanks are due to Paul Stevens for his assistance in setting up this program. A program listing is available on request.

[10] Randomness tests were conducted on the advice of Paul Stevens of the Parapsychology Unit, and consisted of five tests selected after email consultation with Ed May, Dean Radin and James Spottiswoode. These were (i) chi square of incidence of 0's and 1's for each bit of the sampled byte, (ii) correlations between pairs of bits, (iii) simple counts of 0's and 1's, (iv) Kolmogorov-Smirnov tests of distribution, and (v) tests of the number of runs within a stream, irrespective of run size. These tests were conducted on ten runs of data each of 50 bytes. Three of the 50 analyses were significant, in line with chance expectation (A full list of the results of these analyses is available from the author on request). However, these measures really only constituted a pre-measure to ensure that the REG was unbiased, and do not represent a baseline measure against which to compare experimental output. Informed by the criticisms of Alcock (1990) and Hansel (1989), more importance was attached to the dummy data which was at the same level of meaningulness as real data, and was collected under similar conditions during the course of each experimental trial.

[11] The ratio is preferred because it controls for individual differences in Ss tendency to rate all items highly or poorly and the effect this has upon the significance of any difference in ratings. Mean ratings rather than total scores were used because of the necessity to omit without replacement those pre-selected items that were also 'selected' by the REG, which could give rise to markedly unequal variances.

[12] In the light of such unequal numbers of members of comparison groups, non parametric tests were preferred here.

[13] This paper reports on a number of ostensible effects which failed to achieve conventional significance. This may reflect one of two circumstances: (i) the effects are spurious and apparent relationships are due to chance, (ii) the effects are weak and the study was of too low power to capture them. To distinguish between these, the author would ideally conduct a replication prior to submission. However, it is unlikely that this will be possible in the near future and it is hoped that publishing now may stimulate others to attempt to replicate the effect.

[14] We must be wary of taking this comparison too far. Effect sizes from relatively low-N studies can be unreliable.

Chapter 9: Summary and conclusion

9.1 Introduction

This thesis was intended to evaluate the suggestion that many individuals are impressed with the content of psychic readings they have solicited and that this favourable impression can be accounted for principally in terms of the use of pseudopsychic practices known as cold reading. The thesis reports on a sizeable body of research, consisting of ten distinct studies with 1,326 subjects, taking a number of forms, including survey work, detailed exploratory analyses with low N pilots and pre-tests, and more substantial, quantitative experimental studies.

This research was designed to explore in particular the nature of the interaction between client and reader which leads the former to be persuaded that at least some of the material communicated is of paranormal origin. It was argued in Section 1.1 that such research is important to parapsychology in furthering our understanding of the channels of communication which may exist between a subject and their environment so that we are better able to assess whether an account in terms of psi is necessary. More broadly, it was suggested in section 1.6 that studying psychic fraud may inform attempts to model human deception generally[1]. This chapter will briefly summarise the objectives of individual studies, outline some of the implications of the work for our understanding of the reader-client dyad, and suggest some ways in which future research could build upon it.

9.2 Surveying clients' impressions of psychic readings

9.2.1 Summary of main findings

Chapter 2 addressed the claim that a relatively high proportion of the population had attended a reading with a professional psychic and had been impressed with the content of such readings. This was achieved by surveying individuals who appeared on the electoral register of Edinburgh district - the largest universe that was considered practicable. It was found, for the sample surveyed, that a surprisingly high proportion (29.5%) had attended a reading at some time, although fewer (7.9%) attended on a regular basis. Even this latter figure, however, is sufficiently high to suggest that such clients had been given readings which they regarded as satisfactory[2]. This provides some support for the suggestion (Richards, 1990; Schouten, 1994) that encounters with professional psychics may represent an important source of belief in psi, and therefore may be worthy of more sustained attention from parapsychologists.

To this end, it may be appropriate for more attention to be devoted in future research to considering the kinds of claims made by professional psychics about the nature of their abilities and the nature of psi itself. This could take a number of forms, from empirical evaluations of the reader's claim to have paranormal access to information about their clients[3], exploring the social psychological and therapeutic functions which may be served by attending a psychic reading, through to developing an understanding of the range of fraudulent stratagems that may be exploited to fabricate psi effects. If parapsychologists are to adopt the more liberal definition of

their field of study in terms of *ostensibly* anomalous experiences, that has been recommended by some commentators (e.g. Blackmore, 1988; Irwin, 1994) and as has been adopted by the Koestler Chair, then each of these approaches becomes recognisable as a valid avenue of enquiry within parapsychology.

9.2.2 Suggestions for methodological improvements or modifications in protocol

This research could be extended in a number of ways. Most obviously, it should be noted that the sample is only representative of Edinburgh district, and it would be useful to see if the patterns of response reported here were replicated with other target populations.

Secondly, the intention here was to generate a representative sample of the general population to enable us to generate population statistics concerned with people's attitudes towards and behaviour with respect to psychic readers and readings. The mail survey was the most appropriate method for eliciting such information. However, this did place restrictions on the form that the questionnaire could take, since it had to be simple enough for all respondents to be able to complete correctly without assistance.

Future work may adopt other objectives which do not place such severe constraints upon questionnaire format. For example, it may be productive to solicit the opinions of those individuals who have had readings that have impressed them, to determine which elements of the reading contribute to their favourable impression, or to

discover what functions the reading has played for them. Such a questionnaire need not consist wholly of closed questions, but may include opportunities for respondents to express their opinions in their own words, giving rise to more qualitative data.

Sections 2.4 and 3.4 drew attention to the problematic response rates that can be associated with random-sample mail surveys in which non-respondents are not vigorously encouraged to respond. If available resources (both in terms of finance and personnel) are not as limited as in this case, then future surveys may adopt other methods of data collection - such as personal interview or telephone interview, which have the advantage of encouraging higher response rates.

9.2.3 General implications for surveys in parapsychology

In framing this study, attention was paid to the relative merits of assessing attitudes towards paranormal phenomena via self-report of belief versus behavioural indicators. The former has been criticised here (Section 2.1.4) on the grounds that simple self-report may overstate the relative importance of the subject matter of parapsychology to respondents on occasions when they answer affirmatively to questions such as 'Do you believe in ESP?'. For example, evidence was presented to suggest that belief measures fail to take into account that proclaimed beliefs can be sensitive to the context under which they are measured, and that beliefs are not simply all-or-nothing but are likely to reflect different shades of commitment to particular beliefs. Some accounts of the causes of paranormal belief, such as offered by the social marginality and world view hypotheses (see respectively Wuthnow,

1976, and Zusne & Jones, 1982; see also Section 2.1.2), assume that belief is more than a peripheral or trivial concern. Yet attempts to assess predicted relationships between identified demographic variables and paranormal belief fail to take into account these important dimensions of belief. It may even be the case that the failure to find consistent evidence in favour of either of these hypotheses is a consequence of the use of such a relatively crude measure of belief.

Further, although Section 2.1.4 notes that the association between paranormal beliefs and subsequent behaviour has been regarded as one which is so predictable as to be uninteresting, attention was drawn here to the tendency for the relationship between cognitive and behavioural components of an attitude to be more complex than this (cf. Stahlberg & Frey, 1988). Future work could focus on behavioural parameters (such as incidence of attendance at psychic readings) as indicators of belief, and this may provide a more realistic impression of the impact that such matters have upon the general public. These indicators are, of course, not free of problems thmselves, but if used in tandem may be useful in buttressing the findings from more conventional measures.

9.3 Providing an elaborated model of cold reading

9.3.1 Summary of main findings

Chapter 4 criticised current accounts of cold reading and proposed an elaborated model which represented cold reading as a hierarchy of discrete strategies. Predictions were made as to which strategies should be available under what

prevailing conditions. Attention was drawn to the dependence of the hierarchy upon the use of the more basic methods of generating information, which seem likely to rely on the Barnum Effect for success.

9.3.2 Further evaluation of the model

The whole model was not tested directly here, since that would be beyond the scope of this thesis. Rather, empirical work concentrated upon one aspect of the model; namely the reliance of the hierarchy of pseudopsychic strategies upon the effectiveness of lower-order techniques for generating material that appeared impressive, since the model predicted that this would form much of the content of readings which were dependent on cold reading for success.

Future research could attempt to further evaluate the model, for example by reference to anecdotal accounts of impressive psychic readings, and would be especially useful where video or audio recordings of the interaction have been made (such as described by Dutton, 1988). The model makes predictions about the type of information about a client that may be expected to be available via normal communication channels under particular conditions. These predictions are readily testable, and could represent an alternative to Boerenkamp's windows model (see Boerenkamp & Schouten, 1983) as a means of highlighting potentially paranormal elements of a reading.

The model also makes predictions about the order in which certain techniques should tend to occur, as more basic strategies provide reading material which is necessary to allow more complex strategies to be effective. These predictions could be compared with the actual structure of pseudopsychic readings, for example by using audio or video recordings as source material.

9.3.3 Further development of the model

The account of cold reading given in this thesis may be more accurately described as a proto-model, since there is great scope to expand upon or modify elements of it in response to theories or models not considered here, or empirical evidence which provides an insight into some of the techniques described.

It might be informative, for example, to apply the techniques of conversation analysis and discourse analysis (see, e.g., Atkinson & Hermitage, 1984; Potter & Wetherell, 1987) both to communications which occur during sittings with a psychic reader, and also to clients subsequent accounts of readings they have had (see Wooffitt, 1992). Information derived from such sources should be readily accommodated by the model.

Other parts of the model could benefit from findings and theory within social psychology. For example a great deal of research has been conducted within the Hovland tradition (cf. Howitt et al, 1989) which has attempted to identify the psychological and physical attributes which help a communicator to be an effective

persuader (e.g. Hovland et al., 1953). It would be interesting to determine whether similar attributes contribute to the psychic reader's success in persuading the client that his claims are true.

The model may also serve to inform more general theories of deception. It could be expanded or refined by assimilating relevant elements from other general overviews or guides (such as Wiseman & Morris, 1995b). More could be done to integrate this account with more general models of deception such as those suggested by Whaley (1984) and Lambert (1987). If the various forms of deception are actually expressions of a single set of underlying strategies or principles, as suggested by these authors, then such an integration should allow us to identify those generalities.

9.3.4 Applications of the model

The model could have a number of applications. For example, it provides a framework by which accounts of the causes of psychic reading success (e.g. Alcock, 1981; Dutton, 1988; Hoebens, 1981; see Section 1.6) can be organised. Such an organisation could indicate the degree to which these accounts are compatible, and may provide some insight into the relative contributions of these factors to the success of the reading. It also serves to refine or restrict our characterisation of anomalous events in terms of fraudulent techniques, so that for example accounts in terms of cold reading retain the explanatory power that was in danger of being lost through over-liberal use of the term.

We are also likely to be in a better position to determine when an explanation in terms of cold reading or the Barnum Effect is actually plausible in specific cases. Similarly, Section 9.3.1 describes how the model promises to provide a ruler with which to differentiate the results of deceptive techniques from any more interesting anomalous effects. This could allow the researcher to be better able to recognise general strategies of fraud and be able to make predictions about when and how the claimant should be able to be successful if using only trickery. This work could have consequences for parapsychology researchers who are interested in adopting naturalistic experimental conditions which maintain security, or who wish to work with gifted individuals in a manner which is fair to the claims they make about their abilities. Greater awareness of these techniques should better enable the researcher to negotiate a protocol which remains sufficiently stringent to preclude fraud but remains flexible enough to respond to the claimant's physical and psychological needs. As such, the expertise gathered together in this thesis can be used to expand the scope of general guides for future research (such as Wiseman & Morris, 1995b).

This function need not be restricted to the researcher, however, and the information may be useful for lay persons attempting to make sense of readings they have had. This would go some way towards fulfilling the obligation which Schouten (1993) has argued that parapsychologists have to the general public, in helping them to better understand their own anomalous experiences.

Informing clients that one is aware of the methods investigated here may help to dissuade pseudopsychics from even attempting fraud by indicating that the likelihood of detecting trickery is high. This may be combined with assurances that should the claimant be caught cheating then this fact will be widely publicised. Also, increased confidence in the protocol which may occur as a consequence of a better understanding of the channels that need to be effectively controlled is likely to result in other benefits, including that both the experimenter and claimant may be more confident that the effort involved in participating will be worthwhile, as positive results are not so easily dismissed. This in itself may be sufficient to persuade earnest claimants to volunteer to be tested.

9.4 An empirical test of one element of the model

9.4.1 Summary of main findings

As noted in Section 9.3.2, it was considered beyond the scope of this thesis to test the whole model, so subsequent chapters concentrated upon developing a more detailed account of one aspect of the model which predicted that the hierarchy was dependent upon stock spiel items being regarded by clients as accurate. Chapter 5 described an attempt to evaluate whether statements used by pseudopsychics in ostensibly psychic readings are capable of inducing similar patterns of acceptance to Barnum statements when presented via a standard Barnum protocol (see Section 5.1.1 for a description of what this entails). Material drawn from the pseudopsychic literature was mixed with classic Barnum statements and given to Ss ostensibly as feedback from a projective measure completed earlier. Both Barnum and

pseudopsychic items were rated as accurate, although the former tended to be more highly accepted. This may have been due to the performance of a subset of outlying pseudopsychic statements which did not induce acceptance and may have served to depress the performance of the set as a whole. The subset was characterised as being less general or favourable in form than is usually necessary to induce the Barnum Effect. The two item types exhibited similar patterns of acceptance across Ss.

9.4.2 Implications of this work for accounts of pseudopsychic reading

The results of this study suggest that pseudopsychics are recommending the use of some statements which act in a similar way to Barnum statements, and which are capable of eliciting similar (if not quite so extreme) personal validation from recipients. This would tend to support the contention offered by some commentators (e.g. Dutton, 1988; Randi, 1981) that apparently impressive psychic readings are, in part, a consequence of Barnum acceptance. Such an interpretation is in keeping with the general finding that psychic readers tested under controlled conditions do not seem to be more accurate in their predictions than would be expected by chance (cf. Boerenkamp, 1985, 1986; Schouten, 1993).

9.4.3 Suggestions for future research

This research could be extended in a number of ways. For example, the pseudopsychic statements which were adopted here may be somewhat atypical, perhaps by virtue of being selected by the experimenter from a larger pool on the basis of whether they could plausibly arise as feedback from a standard personality

measure. Future research could address this issue, for example by adopting a sham personality measure which better allows the full range of statements to be retained[4].

It may be claimed, however, that statements recommended by pseudopsychics bear little relationship to the content of actual psychic readings. To explore this, actual psychic readings intended for one client could be presented to a number of other clients, ostensibly as a reading derived specifically for them. Such a study would bear upon the question of whether such sketches are equally applicable to people other than the target person, and if so could also be used to gauge whether clients recognise this to be the case. The protocol adopted for such a study would be similar in some respects to Blackmore (1983).

9.5 Exploring the causes of Barnum acceptance

9.5.1 Summary of main findings

It was argued in section 6.1.1 that accounts of the success of the pseudopsychic reading simply by reference to the Barnum Effect are unsatisfactory, since they fail to explain why individuals should be so accepting of general personality descriptions, or why they should find such feedback surprising and impressive. Without this insight, accounts are merely explaining one unknown in terms of another. Despite the fundamental nature of this issue, and the substantial literature concerned with the Barnum Effect generally, there have been relatively few attempts to theorise about or model the effect (see sections 6.1 and 7.1)[5].

The main body of experimental work of this thesis described in Chapters 6 and 7 was intended to represent an attempt to systematically map some of the primary characteristics of Barnum acceptance, and to offer a general account of the mechanism by which the effect may be acting.

Two studies are described in Chapter 6 which bear upon the suggestion that acceptance may be due, at least in part, to properties inherent in the statements themselves. Study 1 replicated the generally unappreciated finding that some Barnum items do not induce acceptance and it was recommended that these rogue items should not be used in future Barnum studies. It was found that Ss could recognise that statements were generally true rather than capturing some trait that was particular to them. However, it was also found that those sketches which were best accepted were regarded as least generalisable, suggesting a self-other distinction which may be characteristic of Barnum acceptance. Study 2 explored the properties of statements which may be influential in inducing acceptance. Previous research was regarded as weakened by only considering the effects of properties in isolation, with other potentially influential (or interacting) attributes either ignored or controlled in a relatively crude manner. It was found that, as expected, statement properties cannot be regarded as independent of one another, at least with respect to the statement pool used here. Reasonably strong statement inter-correlations gave rise to a clear 3-factor structure, with all three factors predicting item acceptance to a significant degree. This was interpreted as supporting the claim that Barnum

acceptance is to some degree a function of properties inherent in the statements themselves.

9.5.2 Suggestions for future work

This research could be extended in a number of ways. The statement pool is still very limited, so that ostensible relationships between acceptance and certain statement properties may be an artifact resulting from the effects of a few idiosyncratic items. Future work could be designed to further expand the Barnum pool by drawing statements from the pseudopsychic literature, or (following Forer, 1949, and Snyder, 1974b) taking descriptions from newsstand astrology and palmistry magazines and books.

Secondly, only a limited number of statement properties were considered here. The criticism of previous work noted above - that it ignores potential interactions or other second and third order effects between attributes - would also apply here with respect to the unrepresented dimensions. Future research may attempt to provide a more comprehensive account of statement properties which 'contribute' to acceptance.

A modified characterisation of Barnum acceptance in terms of an artifactual consequence of information processing processes geared towards deciphering communications from others was developed in Sections 7.1.6 and 7.1.7. This characterisation was informed by schema theory and suggested that Barnum

statements might not be taken at face value but instead may be interpreted in personally relevant ways in order to invest the message with meaning. This process would tend to emphasise those elements which were easily assimilated with knowledge the subject already had about themselves, and tend to de-emphasise those elements which were not.

Two studies were conducted to evaluate this account. These considered the relationships between initial acceptance of statements, and the form in which they were subsequently recalled. Moderate support was found for an expanded characterisation of the action of the Barnum Effect in psychic reading contexts. Although far from convincing, these results are believed to be sufficiently promising to warrant further investigation.

9.5.3 Possible further developments

Future work could take a number of forms. Firstly, given the relative weakness of the effects, a case may be made for conducting a straight replication with a larger cohort of subjects. Given that the study is relatively labour-intensive, this may be best achieved by a number of researchers contributing to a database which may subsequently be meta-analysed rather than as a project for individual researchers.

Secondly, if the recall effects are due to the Barnum Effect itself, and not some aspect of the relatively novel testing environment, then similar distortions would be predicted even where a traditional Barnum protocol is used. It would be worthwhile

to determine if this is the case. It would also be interesting to see what impact there would be if even *more* naturalistic conditions were introduced, for example by having an accomplice give the readings. Positive findings here would add further weight to claims that apparent accuracy in psychic readings can often be attributed to selective or distorted recall of the material that was actually presented.

The protocol developed here may also provide the opportunity to study the predictions of schema theory generally. Thorndyke (1984) has recommended that schema theory be applied to 'real world' problems involving cognition. The application of schema theory to the study of psychic fraud may facilitate the further testing of the schema concept within cognitive psychology (see, e.g., Wiseman, 1992a).

9.6 A speculative account of psychic reading accuracy

9.6.1 Summary of main findings

A final study was stimulated by the findings that Tarot card-derived statements tended to be better accepted than Barnum statements (see Sections 7.3.1 and 7.4) and that Ss who had had readings recognised that statements they had received could apply to others, but felt that they had been *particularly* appropriate for them (see Section 8.1.1). It was speculated that these findings may be accounted for if clients of psychic readings were able to remotely influence the reader's choice of elements for their reading from a larger 'database' in a manner analogous to other DMILS effects.

This account was tested in a study in which Ss received an ostensible Tarot reading consisting of 20 statements. Half of these were selected in advance from a large pool of such statements whereas half were selected from the pool at the time of the reading by sampling a live REG. It was found that REG-selected items were rated by Ss as more accurate than control items, although this was not to a significant degree. 'Success' in item selection was not related to belief or personality variables. It was suggested that although the study failed to elicit effects that achieved conventional significance, the effect sizes reported are of a very reasonable magnitude for REG-based studies.

9.6.2 Suggestions for future work

Moderate support was found for the hypothesized account of psychic reading success. However, these findings did not achieve conventional significance, perhaps in part due to the relatively low power or the study given the likely effect size, so that an important initial step is to attempt to replicate the findings preferably with a higher power study (as noted in Section 8.5). One recent suggestion of a method by which sample sizes can be increased relatively cheaply is to set up experiments via the World Wide Web (see Bierman, 1995). As a computer-based study, the current protocol should readily transfer to that format, and this represents an exciting option

Because of the weakness of the effects here and the strong possibility (until replicated) that they are spurious, we must be wary of drawing unfounded inferences

from the data. However, it may be worthwhile to speculate. In particular, it may be worth considering the implications of the increased effect size here, which is larger than is normally associated with REG work, for future studies of this type. It may be, for example, that the stronger effects here are attributable to the greater ecological validity of the experimental context generated in this study. In particular, it was argued in section 8.5 that this may be a consequence of tailoring a study to directly address Ss actual needs. Future REG work may wish to adopt similar contexts for experiments.

9.7 Chapter summary

This chapter reviews and evaluates the main findings presented elsewhere in this thesis. Particular attention is paid to attempts made to construct a model of pseudopsychic functioning and to empirically evaluate some potentially psychological (and some potentially parapsychological) aspects of that model. Reasonable support was found for the former (and limited support was found for the latter). These results are regarded as sufficiently broad in scope and sufficiently coherent for the model to provide a fruitful foundation for further research into the phenomenon of deception generally, and pseudopsychic deception in particular.

[1] Note that we are not offering the model developed here as a prototype for deception generally, particularly given that some forms of deception (such as lying) are not represented here. Rather, this model intended to inform some aspects of a more general account.

[2] There are, of course, problems in implying a link between clients' repeated attendance at psychic readings and their subjective evaluation of those readings, which is a theme developed in Sections 2.1.2 and 2.1.4, for example belief in the accuracy of readings generally may precede attendance (perhaps influenced by the testimony of others) and such conviction may influence the client's perception of the reading, or the client may be disappointed with the readings thus far solicited but (perhaps because of some robust system of paranormal beliefs) continue to solicit them in the hope of finding a more accurate reader.

[3] Care should be taken to ensure that such evaluations focuses on investigating the phenomena rather than simply serving to provide scientific validation for the individual. Quite apart from the increased likelihood of attracting frauduent claimants if offering this latter service (see Chapter 1), it could be argued that such an approach would be unlikely to extend or clarify our understanding of the processes at work, and so be of little interest to the scientific community.

[4] To some extent, this is true of the studies described in Chapter 7.

[5] Two exceptions may be Johnson et al. (1985) and Furnham & Varian, (1988). Even the three published reviews of the Barnum literature (Dickson & Kelly, 1985; Furnham & Schofield, 1987; Snyder et al., 1977) fail to provide more than an organisation of material by study focus, and do not attempt to bring together disparate findings.

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11: Appendices

APPENDIX 1

Published Papers

1983, *The British Journal of Radiology, 56* DECEMBER 1983

Technical notes

A clinical trial of automatic gain control in obstetric ultrasonics

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As ultrasonic pulses pass through the body they are considerably attenuated, so that echoes returning to the transducer from deep structures are much weaker than those from superficial ones. The majority of ultrasonic scanners have a number of controls that the operator must adjust in order to compensate for the attenuation of the ultrasound beam with depth. These are known as the "time gain compensation" (TGC) controls or by a variety of other names. A good deal of skill is required in manipulating them to produce a well-balanced image in which both superficial and deep structures are clearly depicted. However, basic TGC controls have limitations which even a skilled operator cannot overcome. They are designed principally to correct for attenuation in homogeneous tissue, whereas in obstetric scanning there may be several markedly different types of tissue within the scan plane. Movement of both the probe and the fetus introduces further errors into the TGC which would involve the operator in an unacceptable amount of control manipulation if he were to try continually to correct them. The higher frequencies of ultrasound now being employed in scanning to obtain better resolution are attenuated more strongly by tissue, and this leads to larger errors in setting up the TGC controls. In heart work, tissue movement creates an additional problem.

Electronic control techniques now make it possible to build circuitry into the scanners which senses the general decrease in echo size with depth and applies the appropriate amplification (McDicken et al, 1974; DeClercq & Maginness, 1975). This approach is known as "automatic time gain compensation" (ATGC) or "automatic gain control" (AGC). A number of the most recent scanners have AGC incorporated either as an alternative to the manual TGC controls or as a replacement for them. The MARTI real-time sector scanner manufactured by Fischer Ultrasound Ltd. and used in this trial has both TGC and AGC controls. The AGC system operates by measuring the average signal level within each of 12 different depth ranges. The gain compensation is then automatically adjusted so that the average signal level from each of the depth ranges is approximately the same, given the restriction that the gain must change smoothly with depth. The system has a response time of about half a second. The only variable that can be adjusted by the operator is the overall gain.

In addition to the AGC, the scanner possesses five manual controls used to adjust the TGC in routine work. Two of these are used to set the power of the transmitted ultrasound in 10 dB and 2 dB steps. The other three determine the initial gain of the receiver, the rate at which the gain increases with time (the TGC slope) and the delay between the transmission of a pulse and the time at which the gain begins to rise.

The Clinical Trial

The trial of the AGC system in obstetrics was performed as a first step towards determining the value of automatic gain control in general clinical practice. The AGC system was assessed in two ways:

(1) by a comparison of the images produced using the manual and automatic gain controls in routine obstetric work;
(2) by estimating the different amounts of control manipulation needed to use the manual and automatic controls.

The obstetric images were recorded on grey tone film using a multi-format camera by four experienced radiographers over a period of eight weeks. Photographs of 100 pregnancies were obtained with gestations ranging from 8 weeks to 40 weeks. Both 3.5 MHz and 5.0 MHz probes were used. The photographs were taken in pairs, by first setting up the manual controls and recording the image, and then, without moving the probe, switching to the AGC system and recording the new image. So as to minimise any changes in the structures within the scan plane the time between the photographs was kept as short as possible—typically 30 seconds. Various sections through the uterus were used and the manual and automatic control settings were noted for each pair of photographs.

As a measure of the amount of control manipulation involved, the number of control adjustments that had to be made in order to produce each image was counted.

Results

A total of 119 pairs of photographs were obtained, of which 13 were not comparable due to fetal movement perpendicular to the plane of the scan. The remaining pairs of comparable photographs were judged by a consultant radiologist (S.R.W.), experienced in ultrasonic interpretation, who placed them in the following three groups:

(1) images improved overall by the AGC (45%);
(2) no significant differences between the manual TGC and the AGC (45%); and
(3) AGC images inferior to the manual TGC ones (10%).

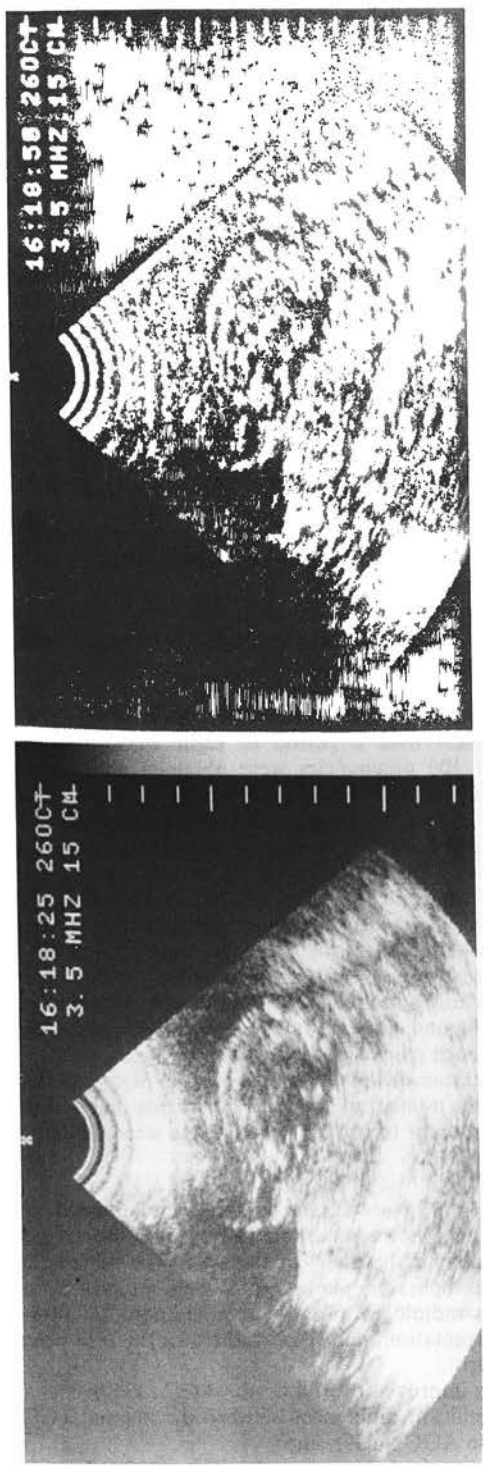

FIG. 1

Right, AGC; Left, manual TGC. Longitudinal section through the head and abdomen of a 14-week fetus. The fetal anatomy is more clearly presented in the AGC image.

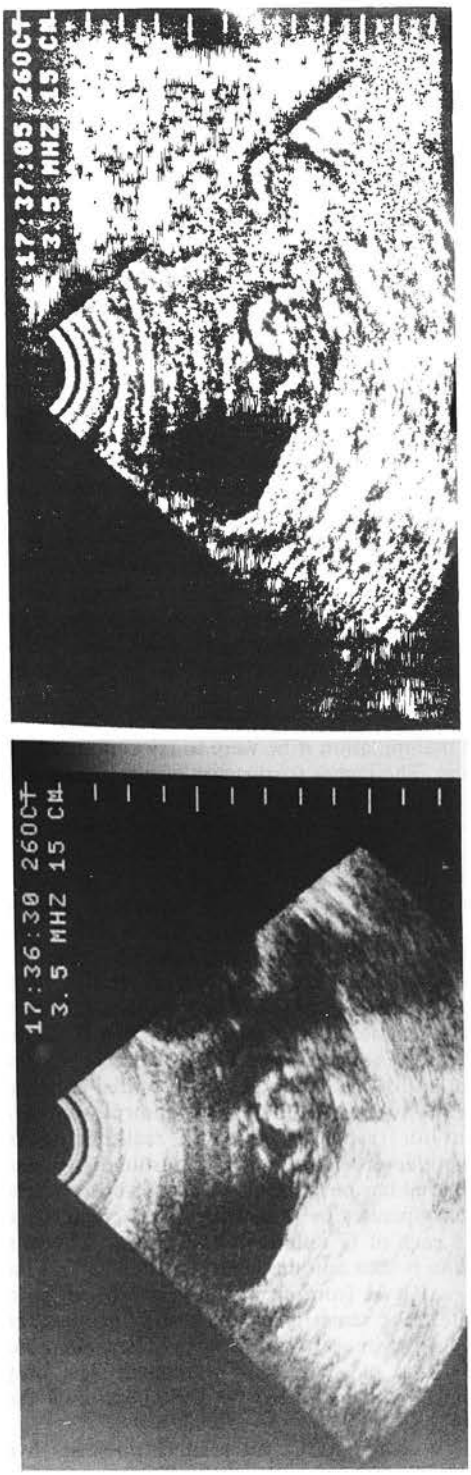

FIG. 2.

Right, AGC: Left, manual TGC. Longitudinal uterine section showing the head and arm of a 12-week fetus. The placenta and uterine walls are clearer in the AGC image.

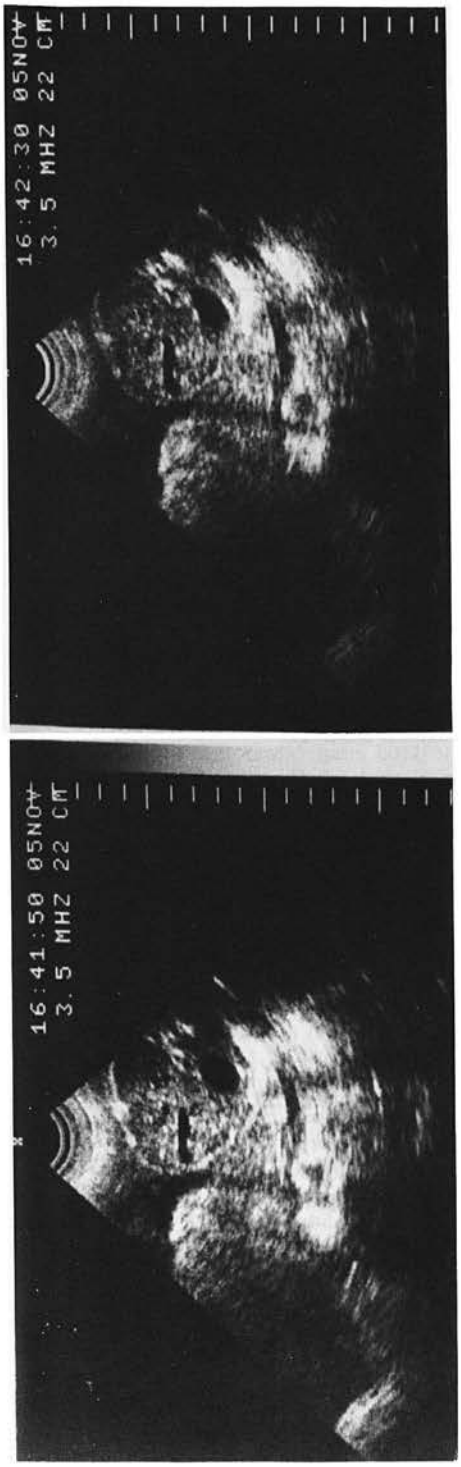

FIG. 3

Right, AGC; Left, manual TGC. Transverse section through the abdomen of a 27-week fetus. there is very little to distinguish the two images.

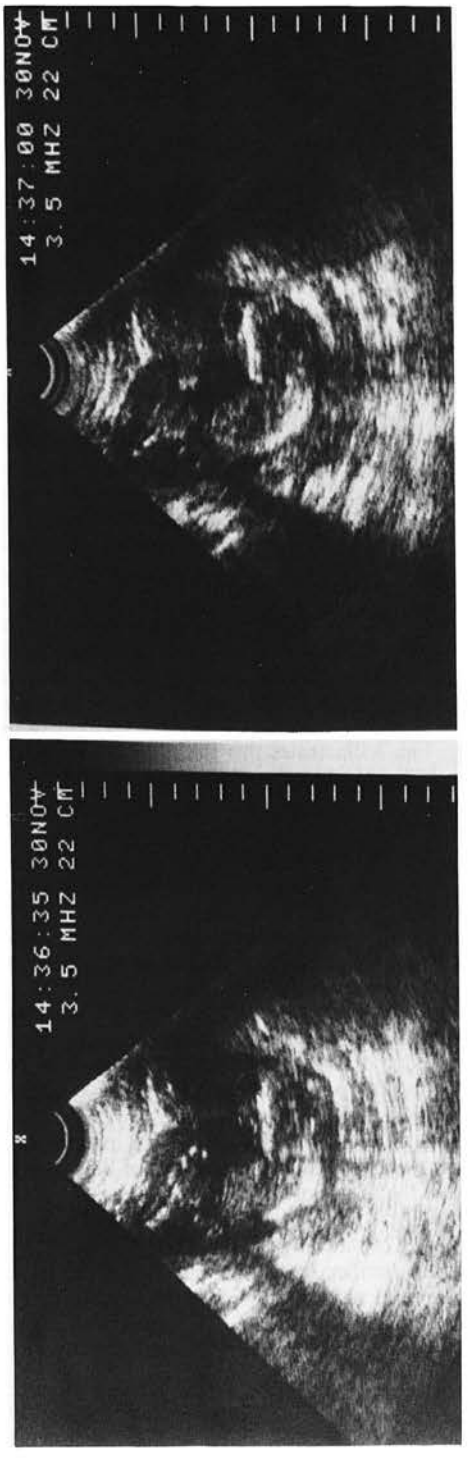

FIG. 4.

Right, AGC; Left, manual TGC. Transverse uterine section through the head and abdomen of a 17-week fetus. The AGC has emphasised the noise and reverberation artefacts in the liquor to a greater extent than the manual TGC.

A blind assessment of the photographs was also made by a hospital physicist experienced in ultrasonic imaging. He placed 45% of the photographs in group 1, 50% in group 2 and 5% in group 3.

A common defect in the images produced using the manual gain controls was regions of saturation within which structural details were obscured. This frequently occurred at the anterior and posterior uterine walls, which are composed of groups of strong reflectors and are often normal to the ultrasonic beam. Since the two walls are separated by several centimetres it is not always possible to compensate accurately by using the manual controls.

Saturation also occurred often at structures lying within or below regions of liquor; since the attenuation of the ultrasound beam in liquor is negligible, manual TGC geared to attenuation in tissue will over-compensate.

The improvements produced by the AGC system were mainly due to a reduction in the amount of saturation in these situations. Since the gain of this system is constant across the scan plane, there was no evidence of compensation for shadowing due to limbs or bones. Figures 1 and 2 are examples of images improved by the AGC.

The photographs in which there were no significant differences between the manual TGC and AGC images usually contained no strongly reflecting surfaces normal to the ultrasonic beam, nor any regions of fluid for which the manual TGC could not compensate adequately. Fig. 3 illustrates this situation.

In only 10% of the photographs were the AGC images inferior to the manual TGC ones. In all cases this was due to an increase in the noise level in large volumes of liquor. Where liquor extended across the width of the image the AGC measured a very low average signal level at that depth, and compensated by applying a large gain, making noise and multiple reverberation artefacts clearly visible. Figure 4 shows where this has occurred in the near field.

The images in which the AGC improved upon or matched the manual TGC were obtained using both 3.5 MHz and 5.0 MHz probes with pregnancies between 8 and 40 weeks (the range of pregnancies included in the study).

The inferior AGC images occurred in pregnancies later than 13 weeks, when there are pools of liquor large enough to fill the width of the image.

CONTROL MANIPULATION

Of the total number of control adjustments used to produce the paired photographs, 80% were used for the manual TGC images and 20% for the AGC images. In general, two or three adjustments of the manual controls were made per scan, increasing to about 10 in the cases where it was difficult to produce a well-balanced image. No more than two adjustments of the AGC were ever necessary in one scan, and for a series of pregnancies at the same stage the AGC could be set initially and then left without adjustment.

The AGC system clearly involves the operator in less control manipulation. This result is not surprising since, like many instruments, the MARTI scanner has five manual controls, several of which are interactive so that changing one setting may necessitate changing another. Manipulating five controls also diverts the operator's attention from the screen, whereas a single control can be adjusted without looking at the instrument panel. This is an advantage, since delicate adjustments of the probe are necessary to image small structures within the body, and anything that distracts the operator's attention makes this task more difficult.

After the scanner had been in use for three months, all four radiographers preferred to use the automatic rather than the manual gain controls. However, the manual controls were employed in particular circumstances in which it was necessary to emphasise a specific region rather than to try to obtain a well-balanced image; for example, to measure BPD in an obese patient; to image a retroverted uterus; or where the fetal head is lying far back in the uterus and echoes from the rear of the skull are very weak. For this reason it is desirable to have the AGC as well as, rather than instead of, manual controls.

CONCLUSIONS

The trial of a commercial AGC system in routine obstetric work demonstrated that for 90% of patients it was capable of producing images as good as, or better than, the manual TGC. With AGC, only about one quarter the number of control manipulations per scan were required. It is concluded that efficient AGC systems offer several benefits to obstetric ultrasonics: improved diagnostic images; more effective use of staff (less time can be spent on adjusting controls and more on making a diagnosis); and fewer problems in staff training, which is particularly important in departments where there is a high staff turnover.

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1985, *The British Journal of Radiology*, *58*, 869–871 SEPTEMBER 1985

A clinical trial of automatic gain control in abdominal ultrasound

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ABSTRACT

Large errors can occur with time gain compensation which is set up manually. These errors occur since basic time gain compensation usually assumes that the tissues being scanned are uniform. Automatic gain control has been somewhat neglected, probably due to a lack of clinical confirmation of its value and reliability.

The trial of a commercial automatic gain control system in routine abdominal work has demonstrated that for 90% of patients it is capable of producing images as good as, or better than, the basic gain controls while involving the operator in fewer control manipulations.

Basic time gain compensation controls have two main limitations: they are designed to correct for attenuation in homogeneous tissue, and they require time to set up correctly. It should be possible to overcome these difficulties using an automatic gain control (AGC) system which senses the general decrease in echo size with depth and applies the appropriate amplification. (McDicken et al, 1974). Several manufacturers have now fitted some form of automatic gain control into their real-time scanners, but a full assessment of the clinical value of AGC has not been made.

Pye et al (1983) describe the clinical trial of a commercial AGC system in obstetric ultrasonics. A second trial has now been completed in which a similar AGC system was assessed in routine abdominal ultrasound work. Pairs of images of the same tissue slice were recorded, one obtained using the basic gain controls, the other using the automatic system. A total of 115 pairs of photographs were obtained from 100 patients, of which seven pairs were not comparable due to movement of the probe. The images were of the normal anatomy and pathology of the liver, kidney, gallbladder, bladder, pancreas and spleen. There were 50 of the comparable pairs which showed pathology and 58 were of normal anatomy. The clinical examinations were performed by two experienced radiologists (S.R.W. and H.M.) using a mechanical sector scanner with 3.5 MHz probe manufactured by GL Ultrasound Ltd.

RESULTS

Two blind assessments of the comparable pairs of photographs were made by a consultant radiologist (S.R.W.) and a hospital physicist (W.N.McD.), both experienced in ultrasonic interpretation. They placed them in the three groups shown in Table I.

The images were judged by the radiologist on the diagnostic information they contained and by the physicist on the presentation of the echo signals in the whole image. The automatic gain control usually produced a well-balanced image with good grey-scale and no large areas of saturation. It tended not to produce acoustic enhancement behind regions of fluid. This was sometimes regarded as a useful feature by the radiologist; for example, when imaging structures deep to ascites, renal obstruction or behind the gallbladder or bladder; and sometimes as a poor feature, such as when trying to confirm the identity of a cyst. Figure 1 is an example of a cyst where there is no acoustic enhancement behind the fluid in the AGC image. Figure 2 shows a polycystic kidney where the lack of enhancement allows the wall structure of the cysts to be seen more clearly. It is recommended that the basic time gain compensation should be switched on briefly to help to identify cysts and other fluid-containing structures. The AGC did not affect the acoustic shadow cast by gallstones and kidney stones and never altered the appearance of liver metastases. Figure 3 shows a kidney stone and Fig. 4 a liver metastasis.

Compared to the basic gain controls, the automatic system requires very few control adjustments. Both radiologists find this an advantage, since having to pause to adjust controls on the instrument panel requires time and diverts their attention from the screen. This makes it more difficult to perform a thorough search through the abdomen where the

TABLE I

	Radiologist (S.R.W.)	Physicist (W.N.Mc.D)
AGC image preferred (%)	16	61
No significant difference between the two images (%)	73	28
Basic TGC image preferred (%)	11	11

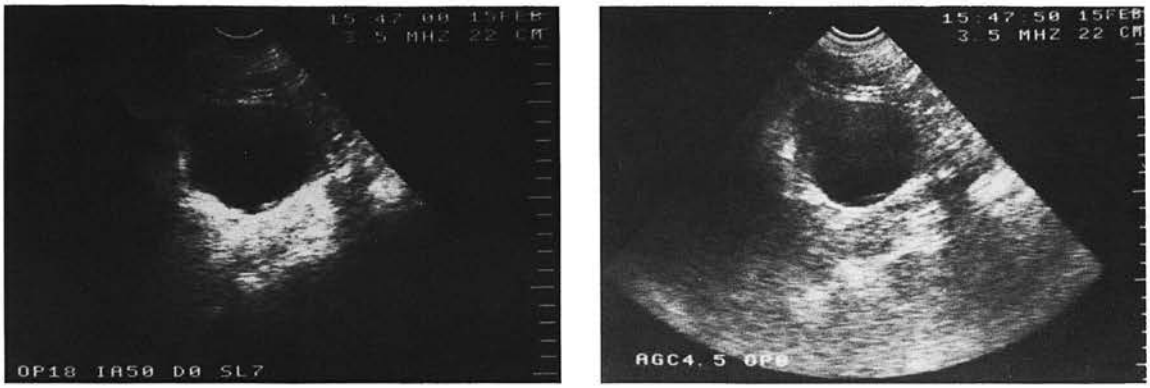

FIG. 1.

Right, AGC; *Left*, basic TGC. Abdominal cyst. There is no acoustic enhancement behind the fluid in the AGC image.

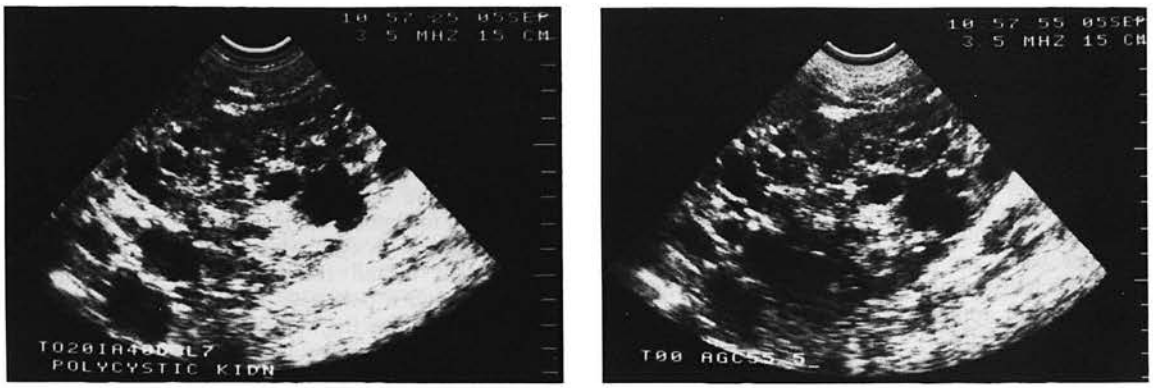

FIG. 2.

Right, AGC; *Left*, basic TGC. Polycystic kidney. The wall structure of the cysts can be seen more clearly in the AGC image.

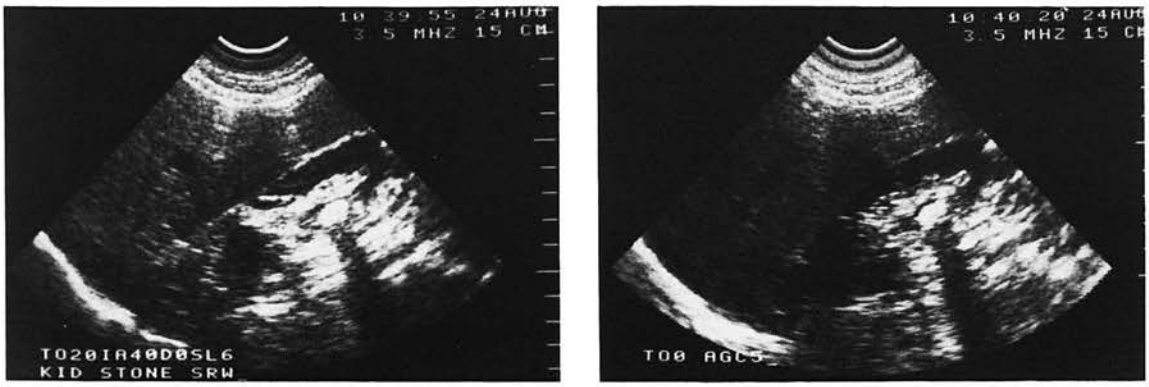

FIG. 3.

Right, AGC; *Left*, basic TGC. Kidney stone. The acoustic shadow cast by the stone is visible in both images.

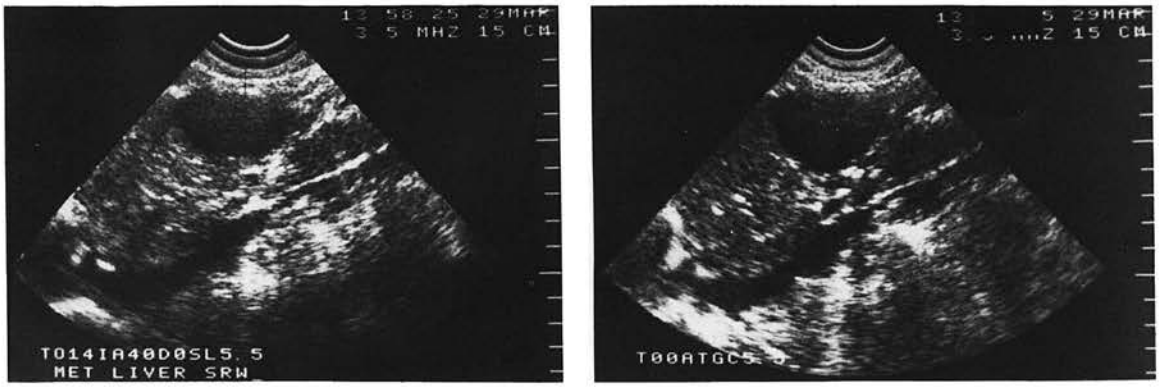

FIG. 4.

Right, AGC; *Left*, basic TGC. Liver metastasis. The appearance of the metastasis is very similar in both images.

different tissues present may require the gain settings to be changed several times.

Conclusion

The trial of a commercial AGC system in routine abdominal work demonstrated that for 90% of patients it was capable of producing images as good as, or better than, the basic gain controls. In the 10% of photographs where the images produced with the basic gain controls were preferred there were only slight differences between the images in each pair. The small number of cases where diagnostic doubt occurred all featured fluid-containing structures where it is imperative to switch on the basic time gain compensation to confirm acoustic enhancement distal to the fluid. The AGC system also involves the operator in fewer control manipulations, making examinations easier to perform and reducing the time spent scanning each patient.

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Book reviews

Health Physics Aspects of the Use of Radioiodines (Occupational Hygiene Monograph No 13). By David Prime, pp. iii+55, 1985 (Science Reviews Ltd, Northwood Middx in association with H & H Scientific Consultants), £6.00 US$11.50+postage & packing.
ISBN 0–905927–76–1

This slim monograph presents in a concise yet comprehensive form not only the basic information but also a quantity of useful facts concerning the health physics aspects of the use of radioiodines.

Much of the essential information is drawn from NCRP or ICRP publications, and that relating specifically to radioiodines includes tables of the physical properties, annual limits on intake, and dosimetry of the eight most commonly used radioiodines, that is, ^{123}I through to ^{131}I. Other essential data are applicable to radionuclides generally and include definitions and explanations of the new and old units of radiation dosimetry and of the basic standards of radiation protection.

Throughout the book, more frequent references are made to ^{131}I and ^{125}I than to ^{123}I which is now in common use. However, ^{123}I is mentioned in respect of contamination levels and in the chapter on safety precautions where there is also a table giving the absorbed dose to the thyroid per MBq of administered ^{131}I, ^{125}I or ^{123}I.

The non-physicist should encounter few difficulties with the chapter covering methods of measurement. Explanations and advice are given in an uncomplicated manner. The reader can quickly appreciate why, for example, a thin sodium iodide crystal is preferable to a thick one for detecting ^{125}I contamination.

Iodine in the body is the subject of another chapter. Here, in addition to the ICRP data for the iodine content of the thyroid (incidentally the amount should be in mg and not g as printed), the effective half-life in the thyroid and the daily intake of iodine, there are brief descriptions of the fate of inhaled or ingested iodine and of the mode of action of thyroid blocking agents.

Technical specifications of six contamination monitors, together with the names and addresses of the manufacturers, are listed in an appendix; likewise the names and addresses of suppliers of radioiodines and of radioiodine-labelled materials.

This 55-page monograph contains a very substantial amount of material which the experienced as well as the first-time or prospective user of radioiodine should find extremely useful.

ALICE HARRISON

Dose Reduction in Diagnostic Radiology (HPA Conference Report Series No. 42). Ed. by Sarah E. Brennan and R. G. Putney, pp. 79, 1984 (Hospital Physicists' Association, London), £9.00.
ISBN 0–904181–36–7

This book contains the nine papers presented at a meeting organised by the HPA Diagnostic Radiology Topic Group in December 1984. It also, very commendably, includes detailed records of the discussions following the three sessions of the meeting. With lively arguments between physicists regarding the merits of K-edge filters and a radiologist estimating that he delivers sufficient collective dose to produce hypothetically one fatal cancer in every seven years, these discussions give immediate relevance to the ideas more formally presented in the papers.

Two introductory papers review the relationships between patient dose and image quality on the one hand and patient dose and risk on the other. These serve to establish the concept of optimisation between diagnostic efficacy and radiological hazard. Detailed treatments of specific dose reduction techniques follow, with two papers on the use of K-edge filters in paediatric radiology and mammography, procedures considered to involve relatively high risks. Contributions from hospital physicists are completed by a study of the causes and reduction of noise in CT images, including interesting experience from one hospital of clinically acceptable noise levels.

To maintain a catholic programme, manufacturers' interests in dose reduction are represented by two papers on current and future developments in rare-earth intensifying screens and the use of the Diamentor transmission ionisation chamber for monitoring patient exposure. The individual views of a radiographer and a radiologist complete the picture, with suggestions on the contributions that their professions can make towards dose reduction and the effectiveness of those contributions in terms of possible lives saved and costs averted.

While the range of new techniques for dose reduction discussed in this report is, of necessity, fairly limited, it does raise many interesting points concerning the philosophy and general principles behind radiation protection of the patient. It consequently serves as a valuable introduction to the subject and a timely reminder for vigilance to those involved in controlling the exposure of patients to diagnostic X rays.

BARRY WALL

Automatic Swept Gain in Ultrasonic Imaging

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23.1 Introduction

The swept gain controls of most ultrasound scanners have two main limitations: they are designed to correct for attenuation in homogeneous tissue and they require time to set up correctly. In real-time scanning where the plane of scan is altered quickly, and with the use of higher frequency probes, inaccuracy in the swept gain settings has increased. The errors involved are not small — for example with 5 MHz ultrasound the attenuation compensation for a 1 cm layer of liquid should be around 10 dB less than for a 1 cm layer of soft tissue.

23.2 Clinical trials

Since ultrasonic equipment can measure the average rate of decrease of echo size with depth, it is possible to set up the gain compensation automatically[1,2]. Automatic swept gain has been somewaht neglected, probably due to a lack of clinical confirmation of its value and reliability. The authors have undertaken two clinical evaluation trials, one in obstetrics[3] and the other in the upper abdomen[4]. The automatic swept gain system used was a commercial unit manufactured by G.L. Ultrasound Ltd. which operates by measuring the average signal level within each of twelve different depth ranges. The gain settings are then adjusted so that the average signal level from each of the depth ranges is approximately the same, given the restriction that the gain must change smoothly with depth. Thus this system assumes that the tissues scanned have uniform backscattering and reflectivity rather than uniform attenuation. The trial in obstetrics showed that the image quality was improved in 45 per cent of cases and equalled that of the manual gain in another 45 per cent. Slight degradatio, due to noise, was encountered in 10 per cent of the images where large amounts of fluid were present in the uterus. In addition, the number of control manipulations was reduced by a factor of four. The results for the upper abdomen were similar to those encountered in obstetrics. Again, 90 per cent of the automatic images were at least as good as those of the manual gain. Subtle image features such as image contract changes due to metastases in the liver were not lost with the automatic system. The differences between the automatic and manual swept gain images were less marked in this trial since there were fewer collections of fluid in the scan planes.

23.3 Digital swept gain system

Developments in digital electronics now allow powerful methods of gain control to be implemented. A microcomputer controlled system has been constructed with which it is possible to store echo data and set up the swept gain automatically. The

micro system is linked to a real-time mechanical sector scanner via an interface in which echo and swept gain data can be stored digitally. This system permits more localised gain compensation than present commercial systems since it allows a unique swept gain function to be generated for each line in the image. A block diagram of the system is shown in *figure 23.1*.

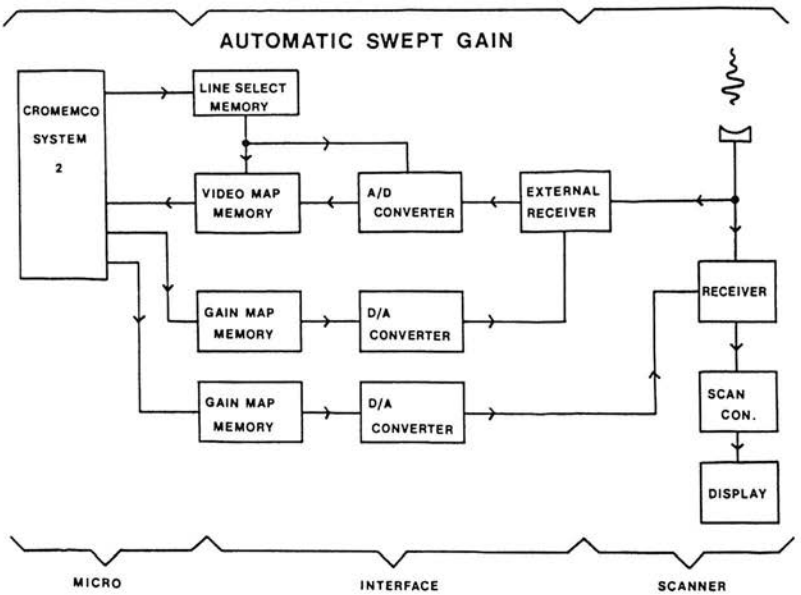

Figure 23.1 Block diagram of the digital swept gain system.

23.4 Collecting the echo data

The micro system can read from an I/O port the number of ultrasound lines in the image. It then selects up to 32 lines from which echo data will be digitised. The data is stored in a block of memory (the video map) in the interface between the microcomputer and the scanner. The signal to be digitised is taken from the input of the RF receiver inside the scanner and amplified by a second receiver in the interface. The video signal from the output of this receiver is then digitised to eight bits at 4 MHz. This corresponds to sampling the echo signal at 0.2 mm intervals down to a depth of 200 mm.

23.5 Processing the echo data

The stored echo data is processed by a Z80 microcomputer using assembly language and Fortran IV. The swept gain functions generated are stored in two blocks of memory (the gain maps) in the interface. One gain map controls the gain of the receiver in the scanner, the other controls the gain of the receiver in the

interface. Each gain map can hold information for a maximum of 256 ultrasound lines. The swept gain function for each line consists of 64 eight bit values, and each value is applied for an interval corresponding to 3 mm down to a depth of 200 mm.

23.6 Speed of operation

During real-time scanning, the field of view is constantly changing. Any gain control system should be able to respond to these changes. Several features were included in the design of the digital system to improve its response time:

(i) The video map and gain map memories are part of the microcomputer memory and can be read and written to directly.

(ii) After the scan lines to be digitised have been selected by the micro the data collection is carried out by the interface independently of the micro, which can continue with other tasks.

(iii) Data in the gain maps has to be read out regularly to the receivers. The micro also needs to access the gain maps to update them. In order to avoid a conflict, and unnecessary delay to the micro, a one line buffer memory is used between each gain map and its receiver. Before being output to the receiver, each line of data is read at 4 MHz into the buffer. After a transmission pulse the data is read out of the buffer at 250 kHz, via a D/A converter, to the receiver. The maximum delay to the micro is thus only the 16 μs needed to load the buffer.

23.7 Conclusions

The clinical trials carried out so far indicate that automatic gain control can have considerable benefits: improved diagnostic images; less time spent adjusting controls; and fewer problems in staff training. The digital gain control system is now operational and will be used to study methods of deriving swept gain functions and the effect of swept gain on resolution and with different frequencies of ultrasound. The system will be tested clinically in abdominal and obstetric scanning.

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4 PYE S D, WILD S R, McDICKEN W N and MONTGOMERY H 1985 A clinical trial of automatic gain control in abdominal ultrasound *British Journal of Radiology* **58** 869–871

APPENDIX 2

Circuit Diagrams

The circuit diagrams of the versatile TGC system are included here on 14 sheets. A brief explanation of the main signals is given overleaf.

		Principal Functions
Echo Board A,	Sheet 1:	Signal buffers onto S100 Bus.
	Sheet 2:	Echo map line and sample counters.
	Sheet 3:	Echo map memory.
Echo Board B,	Sheet 1:	Echo map page select logic.
	Sheet 2:	Echo map BUSY signal generator and wait state logic.
	Sheet 3:	Line map memory and counters.
	Sheet 4:	Simulated PRF and frame pulse generators.
Gain Board A:	Sheet 1:	Signal buffers onto S100 Bus.
	Sheet 2:	Gain map line and sample counters.
	Sheet 3:	Gain map 1, one-line buffer memory and D to A converter.
	Sheet 4:	Gain map 2, one-line buffer memory and D to A converter.
Gain Board B:	Sheet 1:	S100 Bus buffer enable signals. Sequencer to latch number of lines in frame into IO port.
	Sheet 2:	Gain map page select logic and wait state logic.
	Sheet 3:	One-line buffer memory control signals.

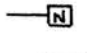
Echo and Line Map Signals

PSEM	Page select echo map. High indicates that the 32k echo map is enabled in the Z80 address space.
PSLM	Page select line map.
BUSY1	Echo board busy: becomes active as soon as PSLM goes low.
BUSY2	Echo board busy digitising: signal is high during the frame being digitised.
LS*	Line select. Active while a line is being digitised.
LSCE*	Line select chip enable. Enable signal for the 256 bit line map.
Φ	4MHz system clock
Φ_{EM}	Φ gated by LS*
WAITRQV	Wait request from echo map: active when BUSY1 and PSEM or PSLM become active at the same time.
PRF	Pulse Repetition Frequency.
FP	Frame Pulse. Marks the end of each scan frame.

Gain Map Signals

PSGM	Page select gain map. High indicates that the 32k of gain maps 1 and 2 is enabled in the Z80 memory.
MEMFULL	Memory full. Active when the gain sample counters reach the end of a line.
BMLD	Buffer memory load. Active when the two one-line buffer memories are being loaded.
BMWRT*	Buffer memory write. Φ gated by BMLD .
DAL	Latches output of buffer memory into D to A converter
SCLK	Clock signal to gain sample counters: either 250kHz or 4MHz
LATCH	Pulse to latch output of line counters into IO port.
LCCLR	Pulse to clear line counters.
DOEN	Data out enable. Enables DATA OUT buffer on S100 Bus.
DIEN*	Data in enable. Enables DATA IN buffer on S100 Bus.
ADEN	Address enable. Enables address buffer on S100 Bus.
WAITRQG	Wait request from gain map. Active when BMLD and PSGM are active at the same time.

Symbols



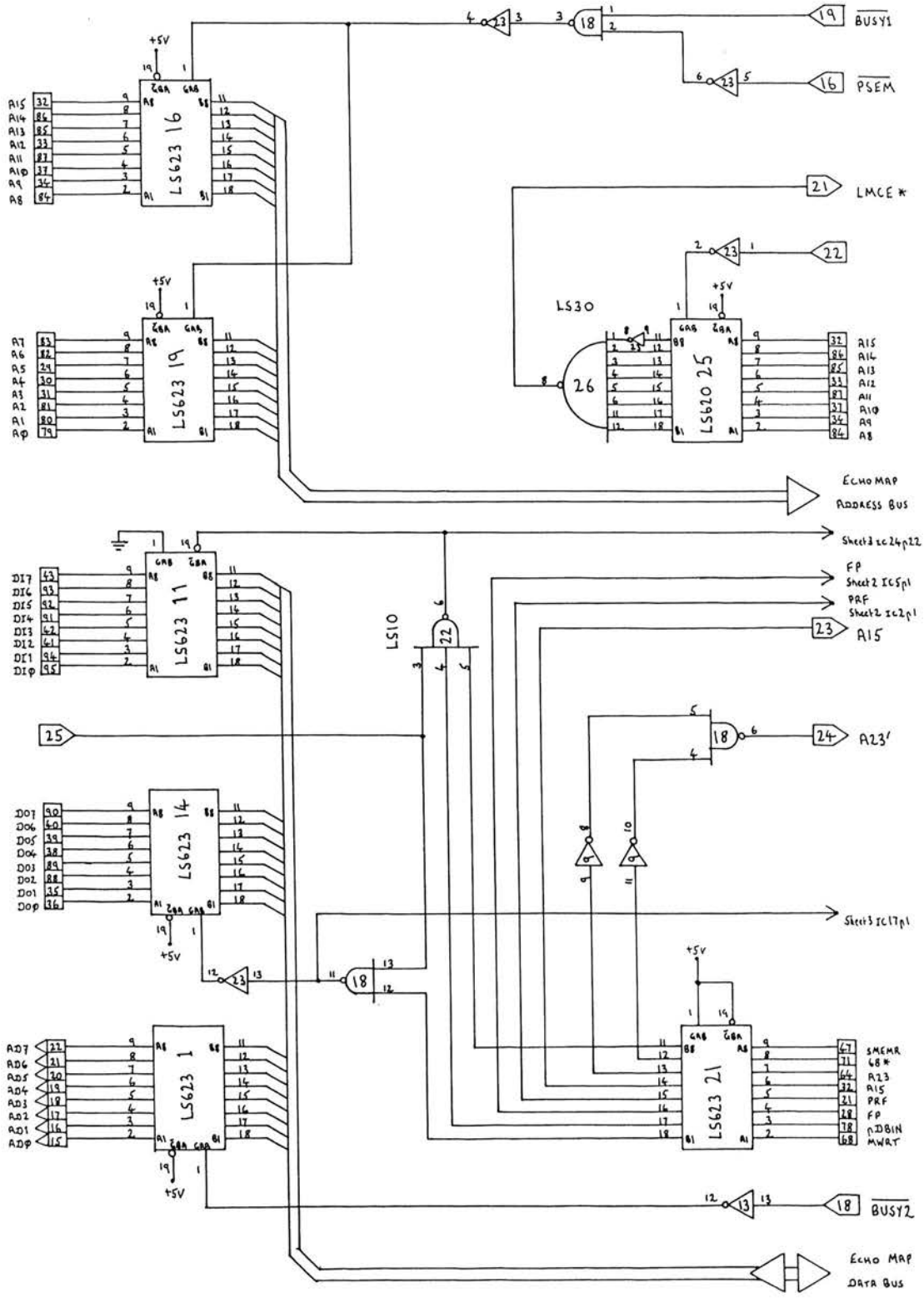
S100 Bus line, pin N .

Inter-board ribbon cable connection, pin M.

circuit continued on another sheet.

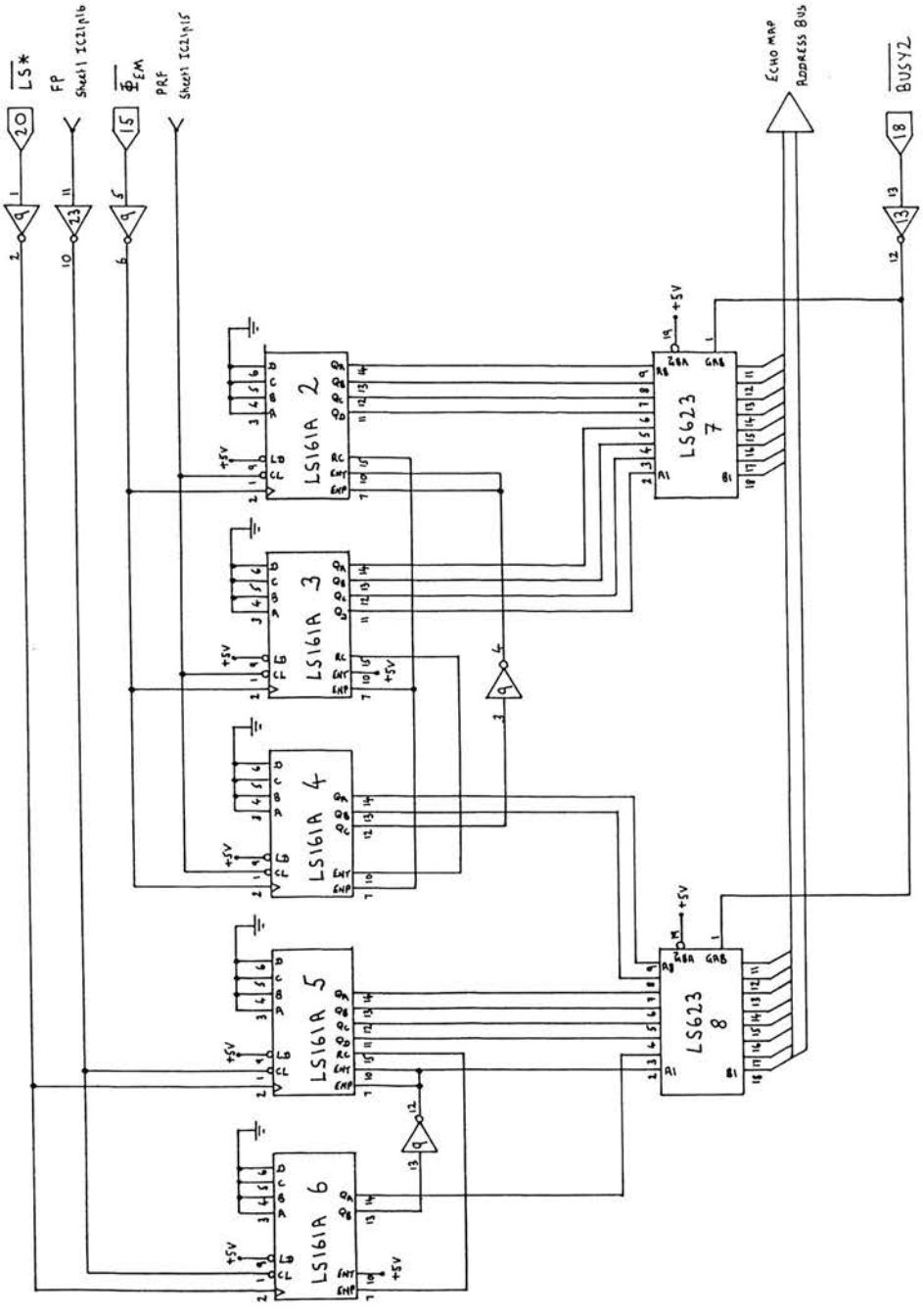
ECHO BOARD A

Sheet 1 of 3 Buffers to Micro System



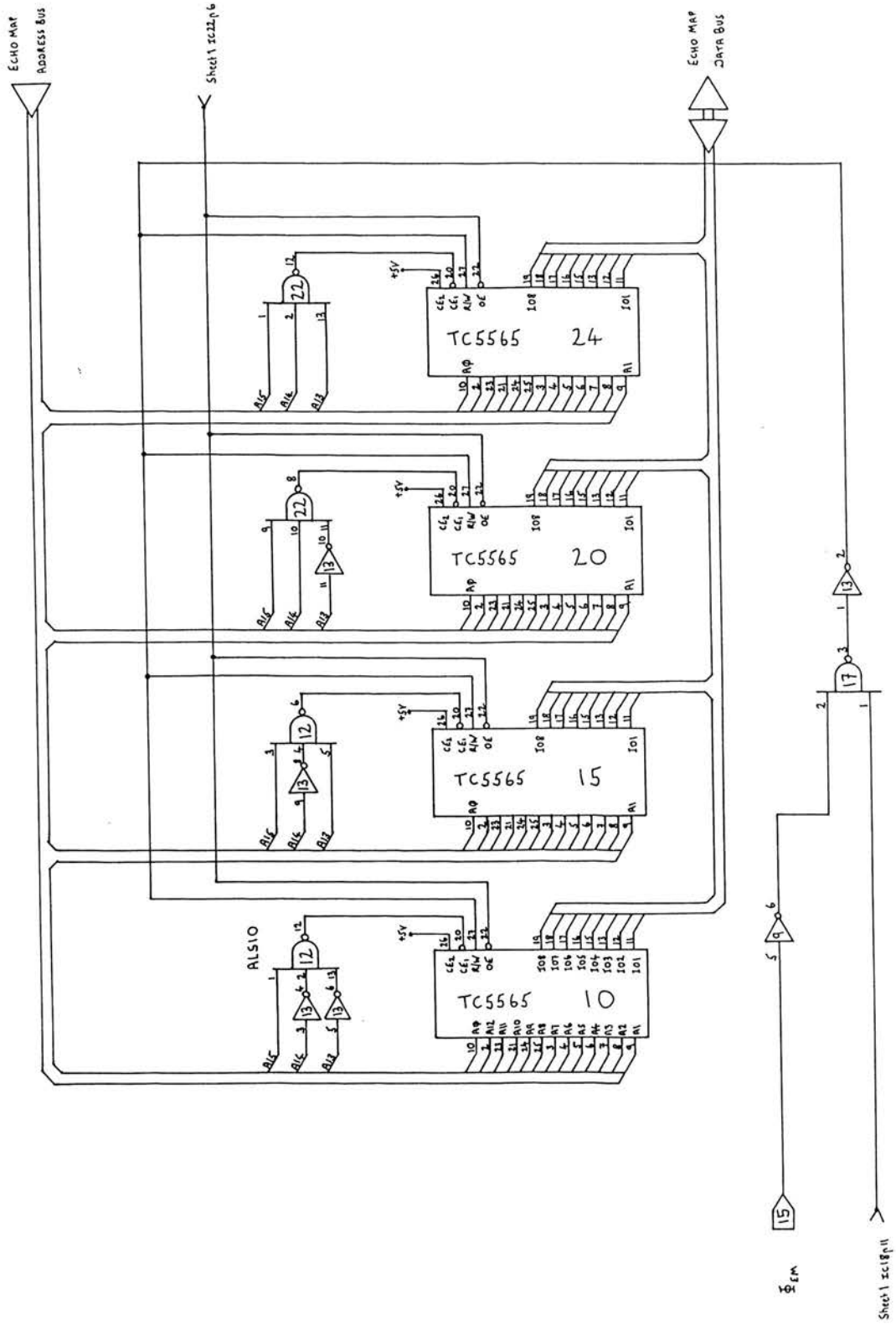
ECHO BOARD A

Sheet 2 of 3 Line and Sample Counters



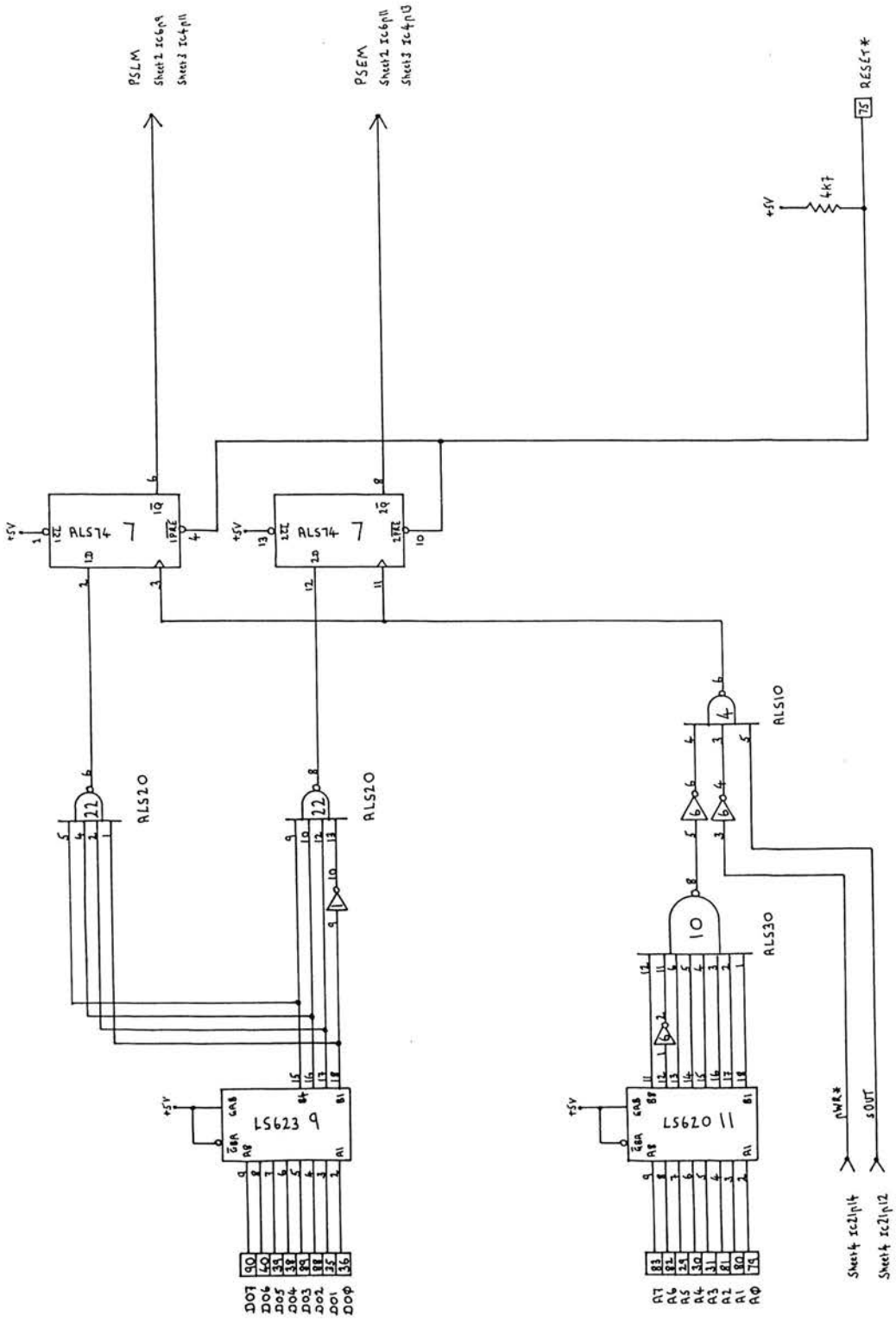
ECHO BOARD A

Sheet 3 of 3 Echo Map



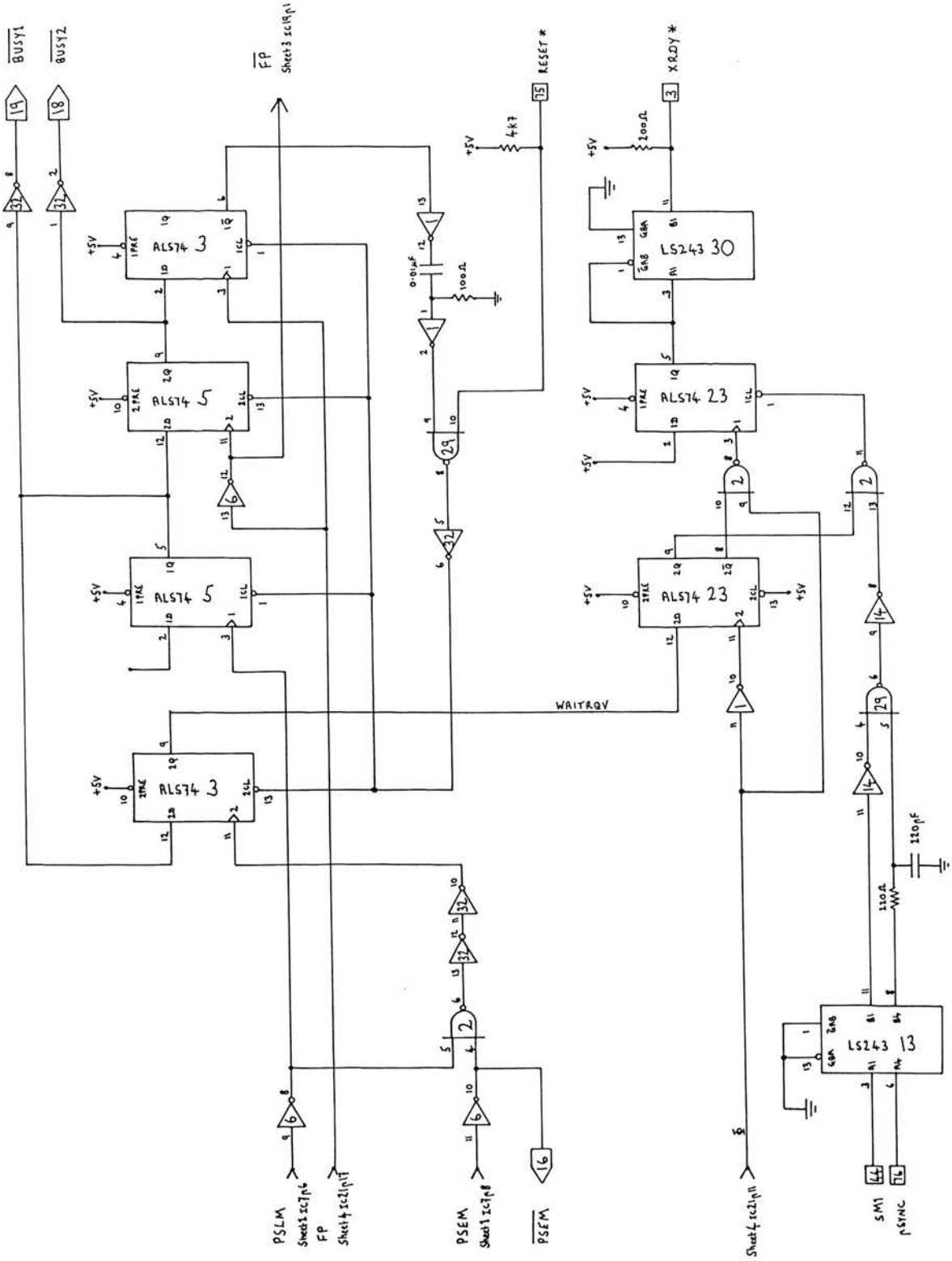
ECHO BOARD B

Sheet 1 of 4 Page Select Logic



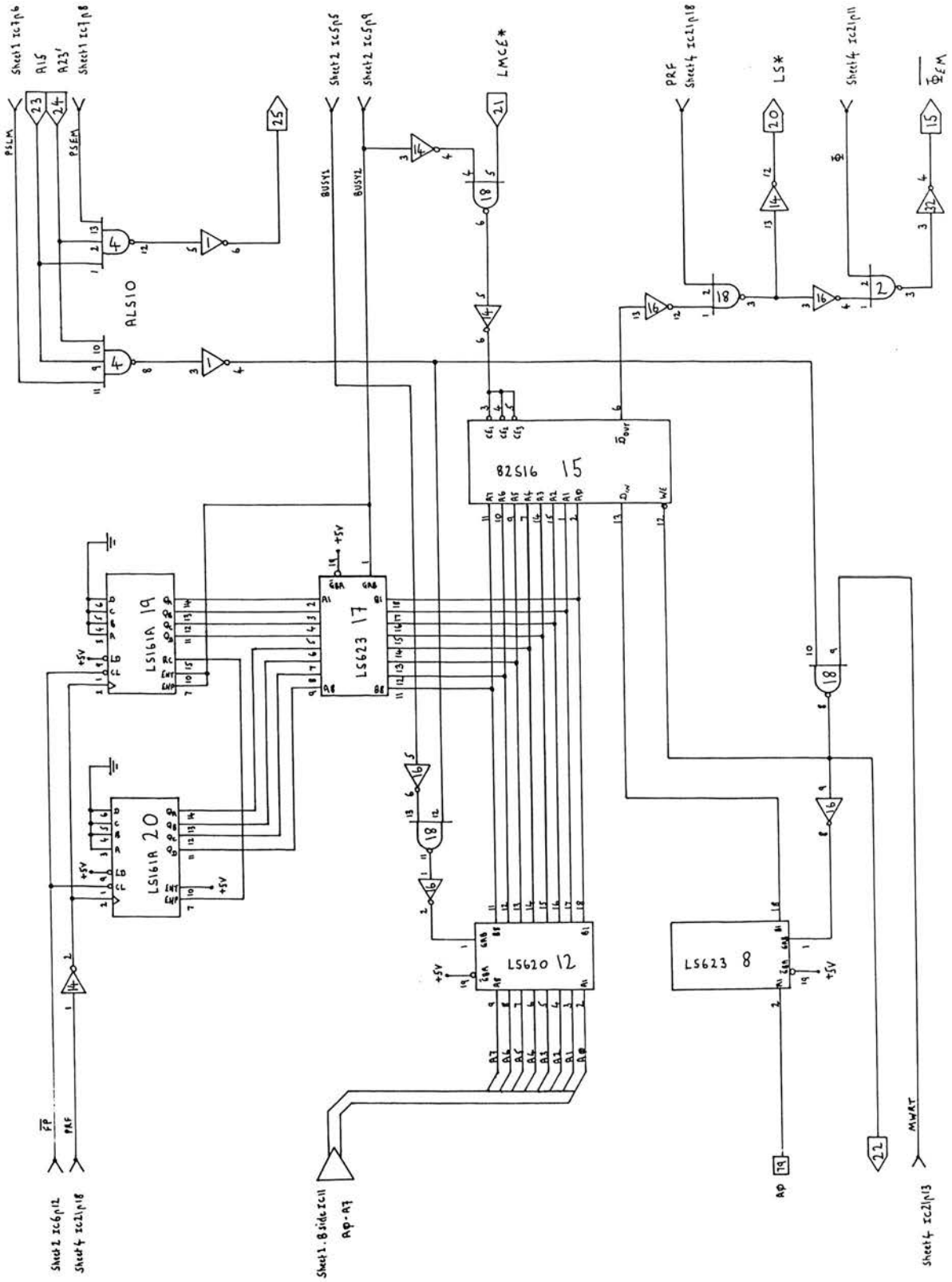
ECHO BOARD B

Sheet 2 of 4 Busy Signals and Wait Request Logic



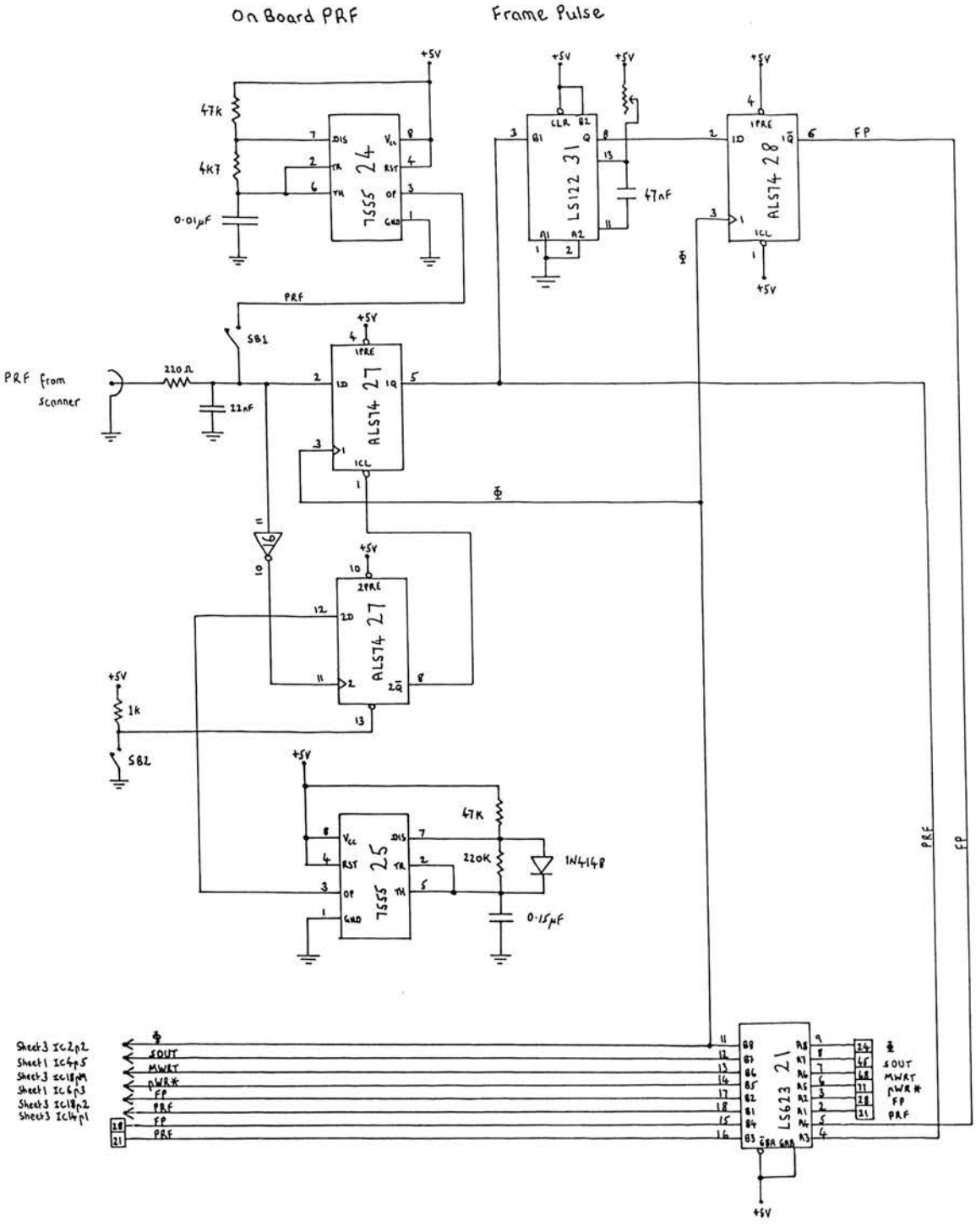
ECHO BOARD B

Sheet 3 of 4 Line Map and Counters



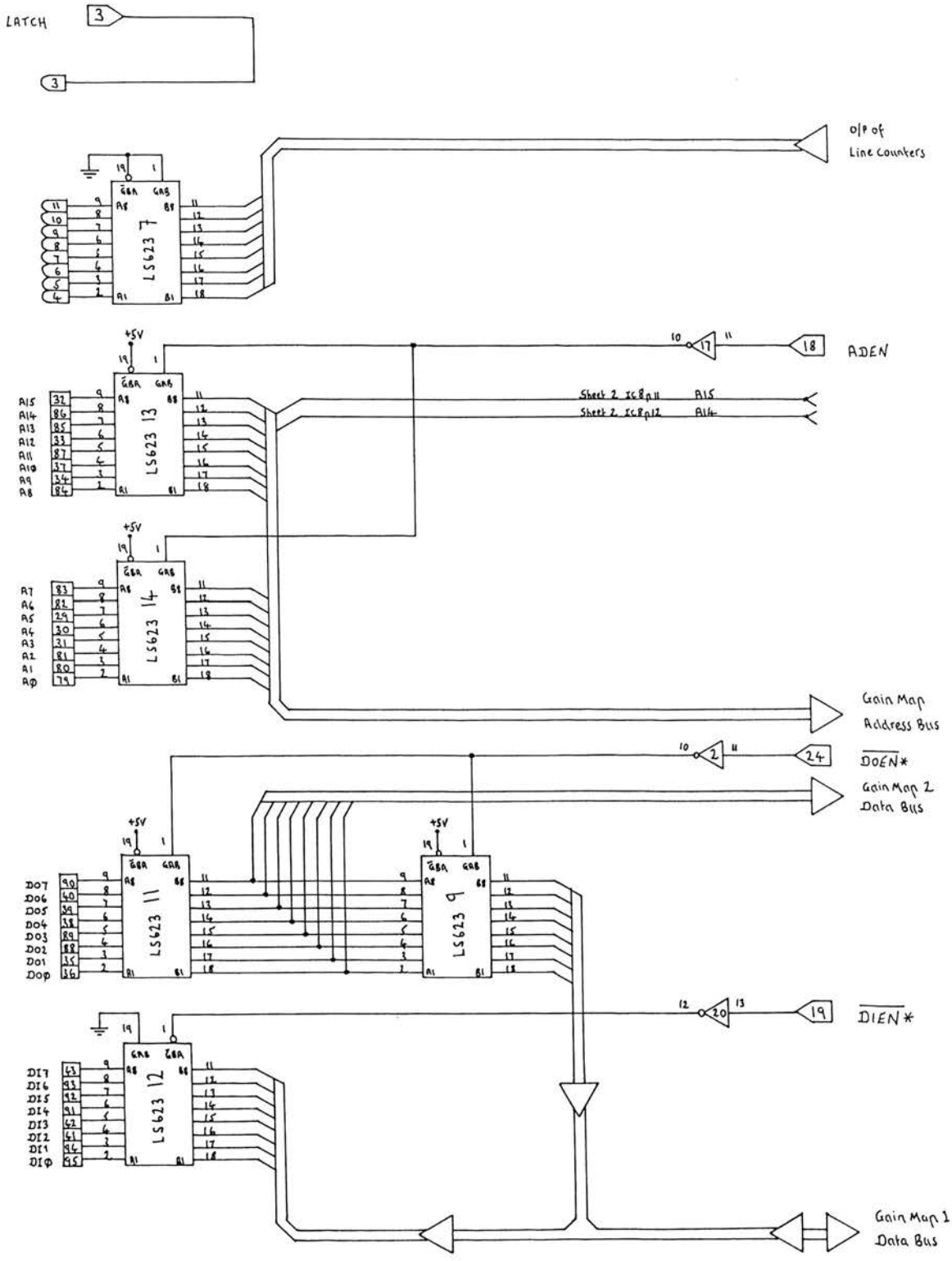
ECHO BOARD B

Sheet 4 of 4 On Board PRF and Frame Pulse Generator



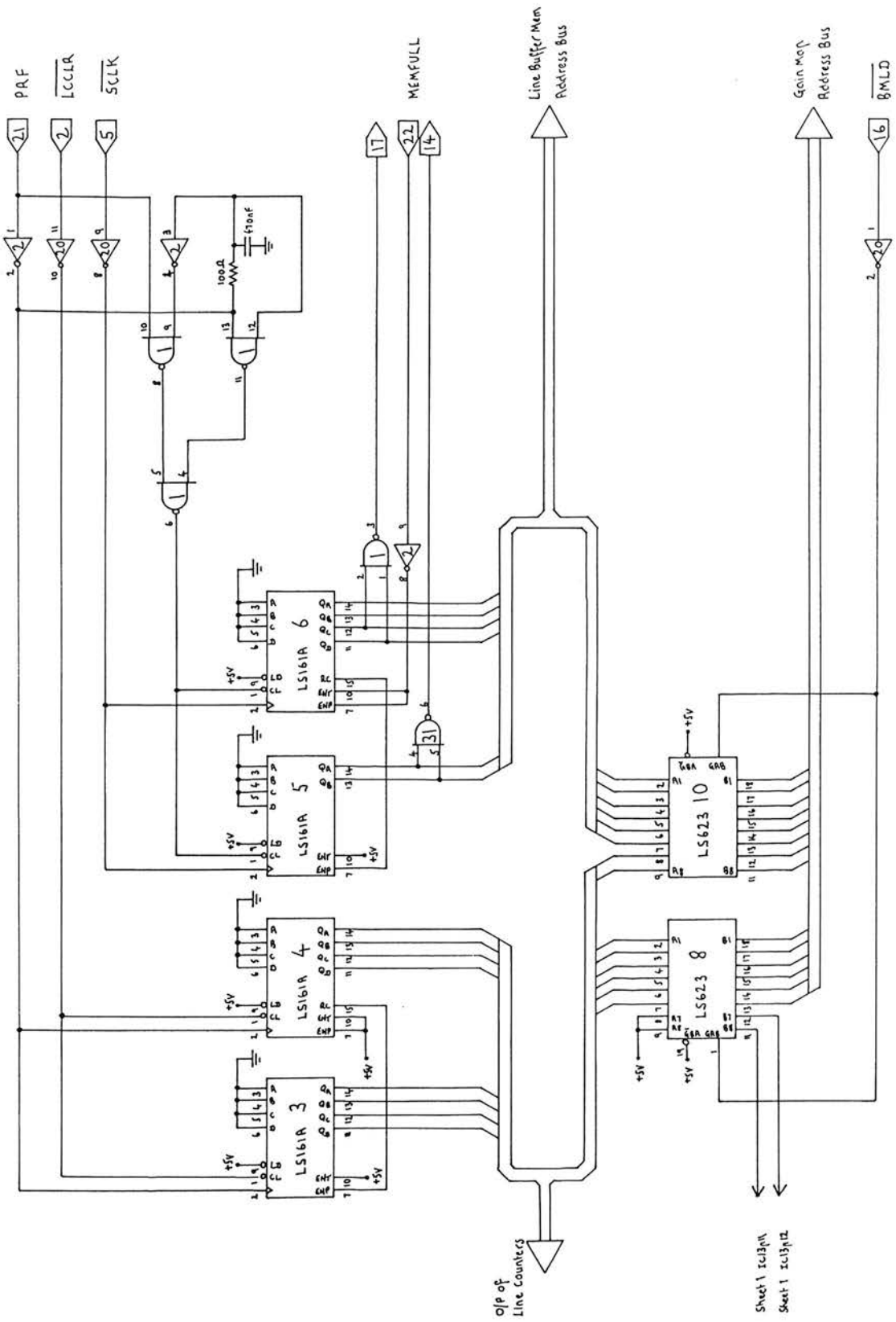
GAIN BOARD A

Sheet 1 of 4 Buffers to Micro System



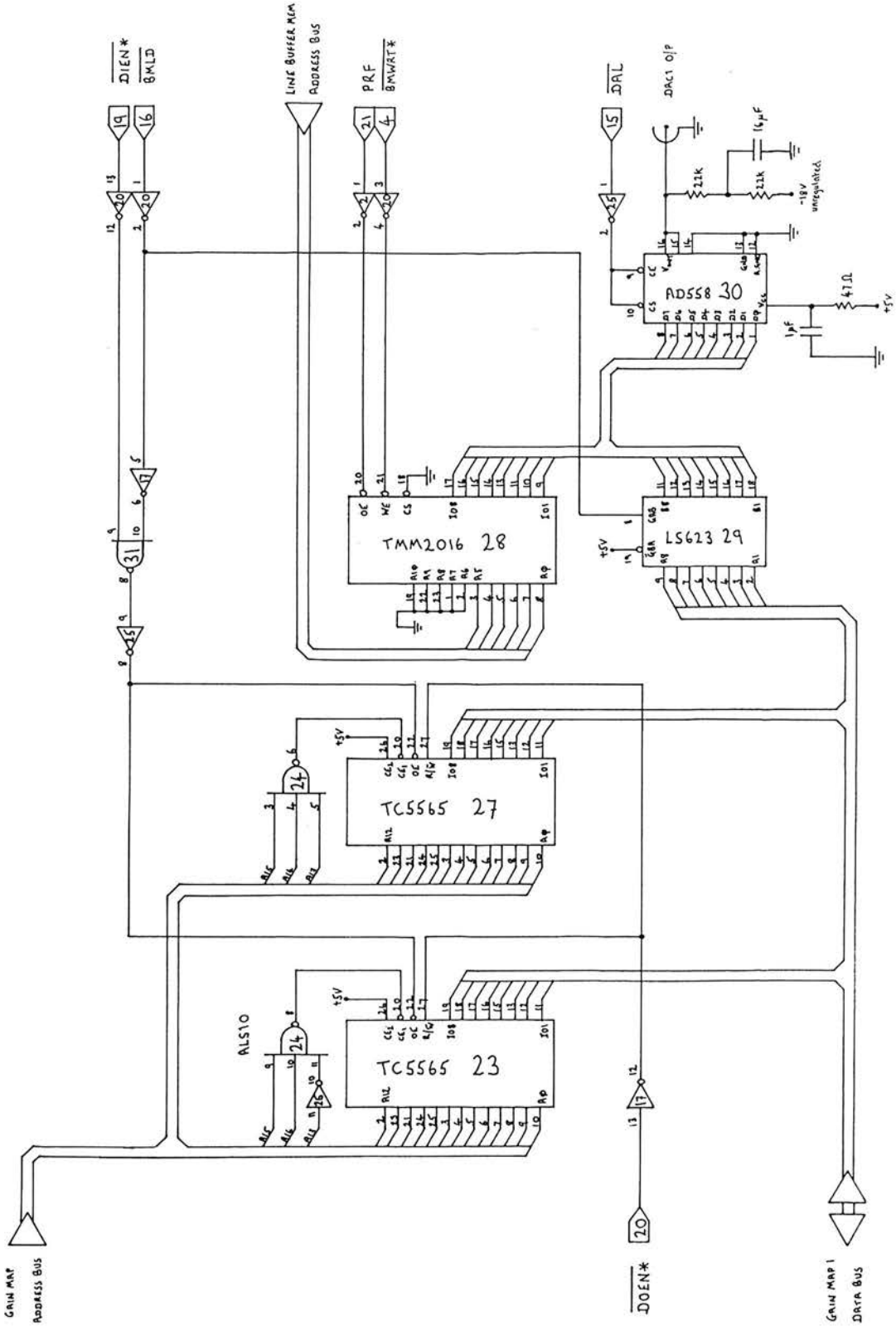
GAIN BOARD A

Sheet 2 of 4 Line and Sample Counters



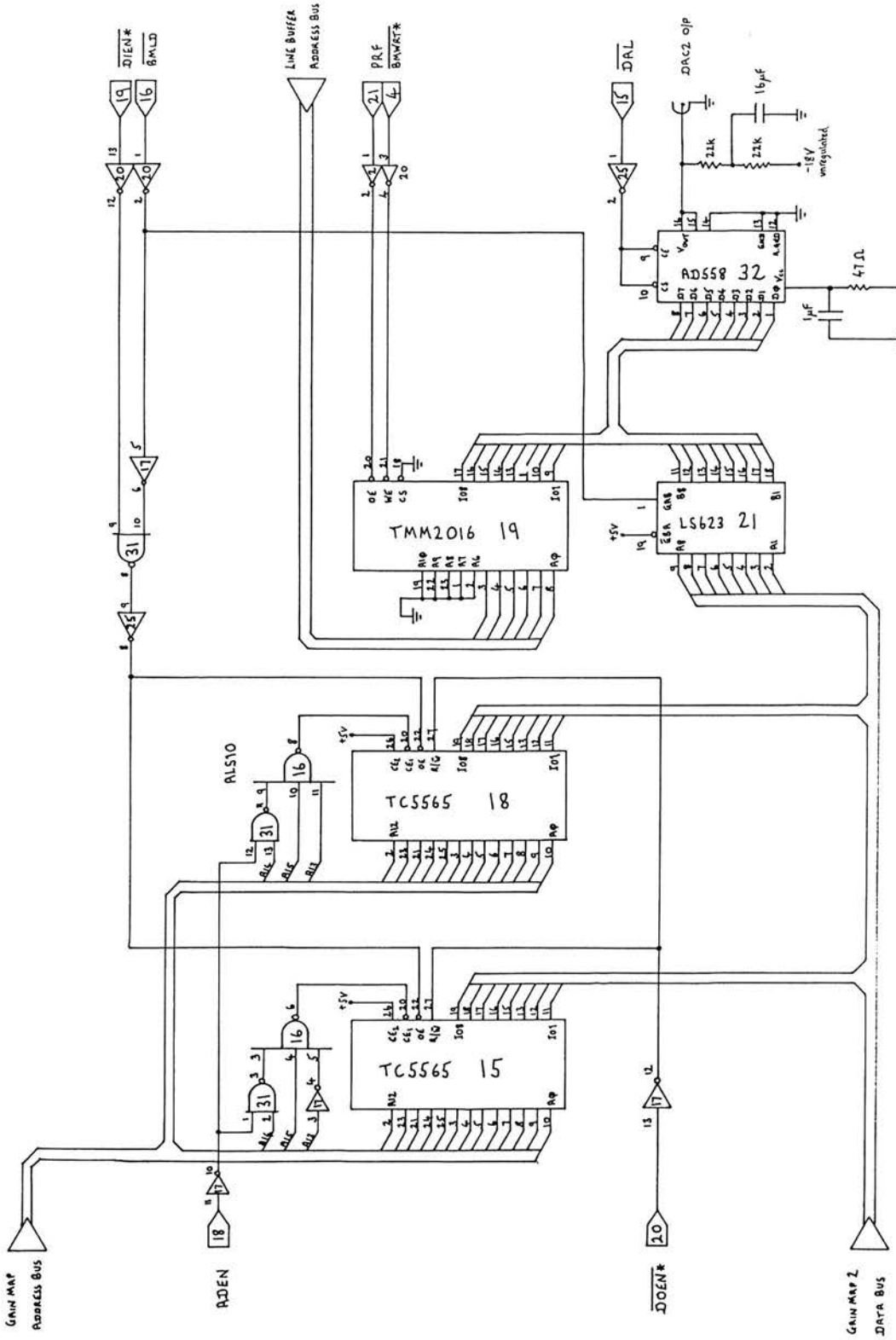
GAIN BOARD A

Sheet 3 of 4 Gain Map 1 , Line Buffer Memory , DAC 1



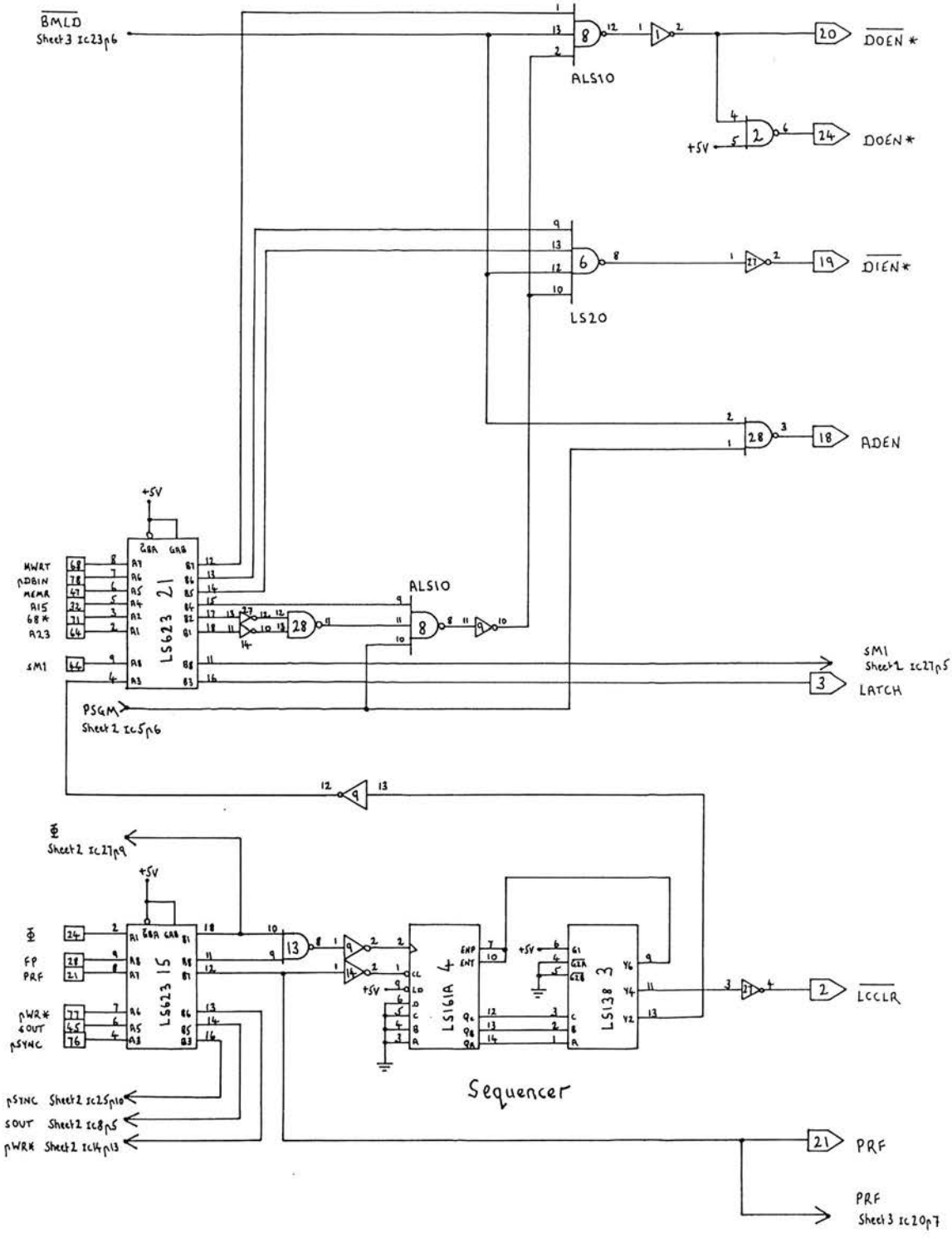
GAIN BOARD A

Sheet 4 of 4 Gain Map 2, Line Buffer Memory, DAC 2



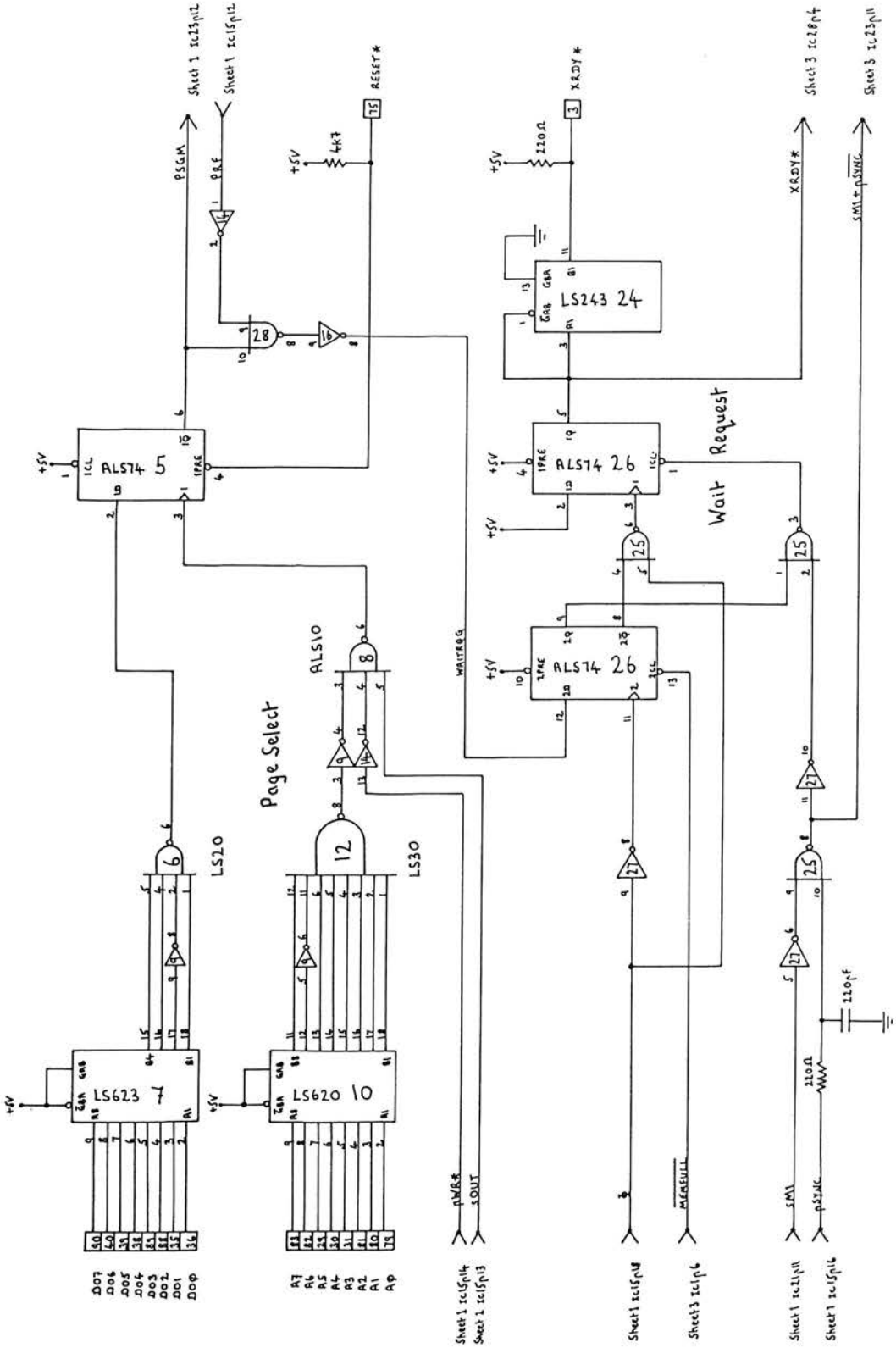
GAIN BOARD B

Sheet 1 of 3 Buffer Enable Signals and Sequencer



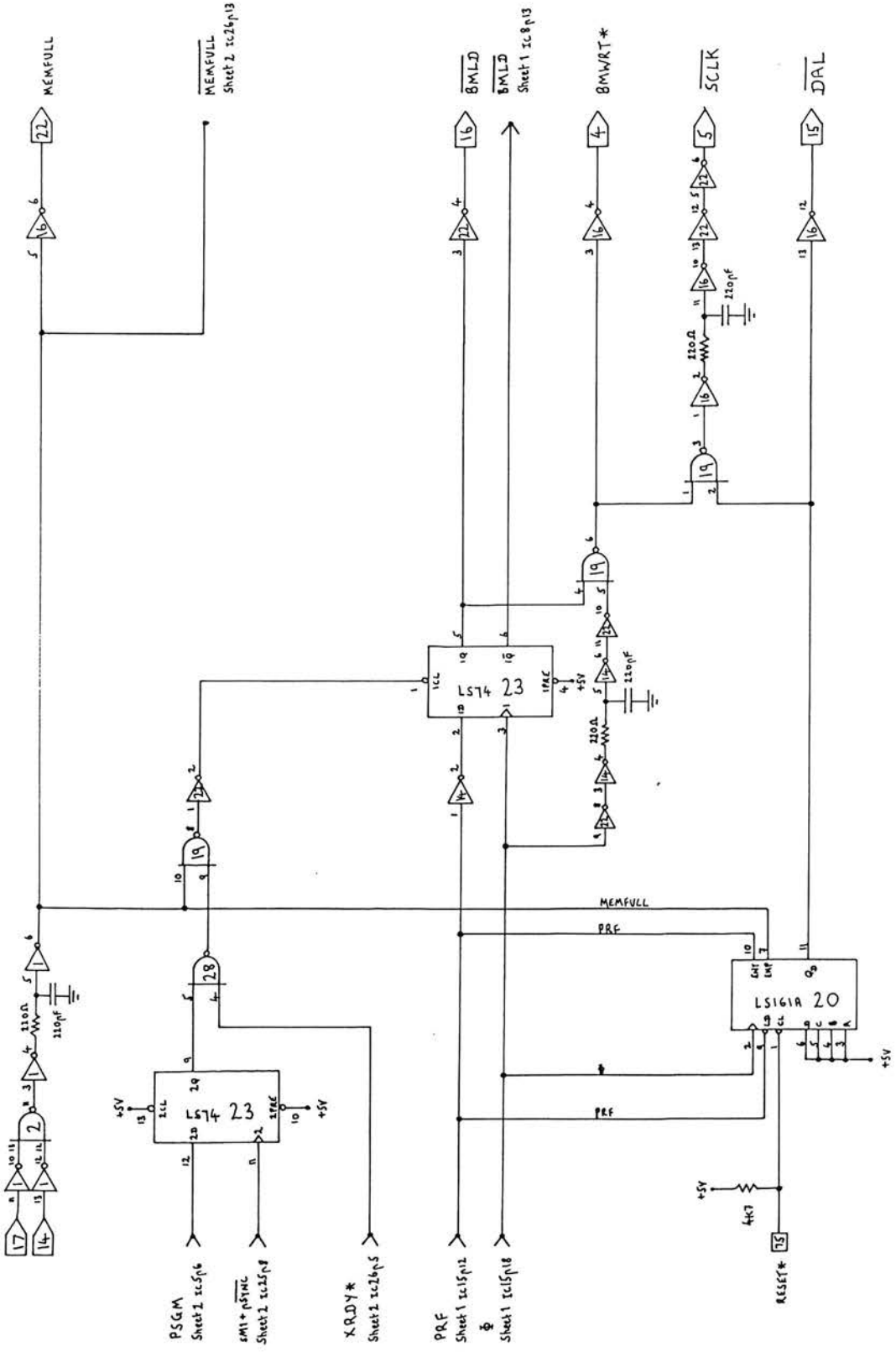
GAIN BOARD B

Sheet 2 of 3 Page Select and Wait Request Logic



GAIN BOARD B

Sheet 3 of 3 Buffer Memory Control Signals



APPENDIX 3

Program Listings

```
A.C*************************************************************
C*                                                            *
C*       INDEX TO SUBROUTINES CALLED FROM FORTRAN PROGRAMS    *
C*                                                            *
C*************************************************************
C
C
C  ADDLN( LN,EC )          FORMS INTEGER ECHO FUNCTION EC(64) USING
C                          LINE OF DATA LN IN ECHO MAP.
C  AVR32( EL,AVR )         RETURNS THE MEAN VALUE (AVR) OF INTEGER
C                          ARRAY EL(32)
C  BLEEP                   BLEEPS THE KEYBOARD
C  CLCGN( EC,RGAIN,GAIN )  USES ECHO FUNCTION EC(64) TO CALCULATE
C                          INTEGER GAIN FUNCTION GAIN(64). RGAIN(64)
C                          IS MODIFIED GAIN(64) TO ALLOW FOR ELECTRONIC
C                          DELAYS
C  DSL64( ARR )            DISPLAYS INTEGER ARRAY ARR(64) ON TV SCREEN
C  GNMAP                   FILLS NLIN LINES OF GAIN MAP 1 WITH GAIN
C                          FUNCTION SGAIN(64)   (PASSED AS COMMON)
C  IADD64( ARR1,ARR2 )     ADDS INTEGER ARRAY ARR1(64) INTO INTEGER ARRAY
C                          ARR2(64)
C  IDIV64( ARR,NSHFT )     DIVIDES INTEGER ARRAY ARR(64) BY 2,4,8,16..
C                          THE NUMBER OF RIGHT SHIFTS IS GIVEN BY NSHFT
C  ILD64( ARR1,ARR2 )      LOADS INTEGER ARRAY ARR1(64) INTO INTEGER
C                          ARRAY ARR2(64)
C  IZER64( ARR )           ZEROES INTEGER ARRAY ARR(64)
C  IZER32( AR  )           ZEROES INTEGER ARRAY AR(32)
C  INMEM                   SETS UP GAIN MAPS 1 AND 2 WITH SLOPE 6 dB cm
C                          AND INITIAL ATTENUATION 40 dB
C  LNCNT( NLIN )           READS IO PORT AND RETURNS NLIN, THE CURRENT
C                          NUMBER OF SCAN LINES PER FRAME
C  MAX32( EL,MAX )         RETURNS THE MAXIMUM VALUE (MAX) IN INTEGER
C                          ARRAY EL(32)
C  MED32( EL,MED )         RETURNS THE MEDIAN VALUE (MED) OF INTEGER
C                          ARRAY EL(32)
C  NWREF                   FORMS NEW GAIN FUNCTION GAIN0(64), USED FOR
C                          DATA COLLECTION. (GAIN0 PASSED AS COMMON)
C  SETGN( GAIN,SGAIN1)     COMBINES GAIN FUNCTIONS GAIN AND SGAIN1
C                          GAIN(64) IS FORMED INTO GAIN FUNCTION THAT
C                          IS APPLIED TO IMAGE
C  SMP32( K,SHIFT,EL )     FORMS ARRAY EL(32) OF ECHO VALUES AT THE
C                          SAME DEPTH ACROSS THE IMAGE. K DEFINES
C                          DEPTH ( K=1,64) AND SHIFT ALLOWS FOR DELAYS
C                          IN THE ELECTRONICS
C  SMGNX                   APPLIES 4 POINT LOCAL MEAN SMOOTHING
C                          OPERATOR ACROSS GAIN MAP 1
C  SMGNY( GAIN,SGAIN,SMTH)  FORMS SMOOTHED GAIN FUNCTION SGAIN(64)
C                          FROM GAIN(64). SMTH DEFINES THE WIDTH OF
C                          THE SMOOTHING WINDOW
C  STG1( SGAIN,FROM,FOR )  WRITES GAIN FUNCTION SGAIN(64) INTO
C                          GAIN MAP 1, STARTING AT LINE 'FROM' AND
C                          CONTINUING FOR 'FOR' LINES.
C  STG2( SGAIN,FROM,FOR ) SAME AS STG1, BUT FOR GAIN MAP 2.
C  STG1G2( SGAIN,FROM,FOR ) SAME AS STG1, BUT WRITES INTO BOTH
C                          GAIN MAPS
C  STLSM                   SETS UP LINE MAP MEMORY USING INTEGER
C                          ARRAY L(32).   ( L PASSED AS COMMON )
C  STVMA( SHIFT )          ADJUSTS START ADDRESS IN ECHO MAP TO ALLOW
C                          FOR DELAYS IN ELECTRONICS
C  VALS                    REQUESTS USER TO TYPE IN PROGRAM VARIABLES
C
```

```
C
C       3 FEB 1987
C       CONTRAST SIMULATION OF ADAPTIVE TGC ALGORITHMS
C       OPERATES ON 64*64 ARRAY
C       SIMULATES SINGLE OBJECT (LESION) POSITIONED CENTRALLY
C       IN UNIFORM BACKGROUND
C
        PROGRAM SGSIM2
C
C****** VARIABLES
C
C       SCATL, SCATB ARE ARRAYS DEFINING THE BACKSCATTERED
C                    AMPLITUDES OF THE LESION AND BACKGROUND
C       ATTNL, ATTNB ARE ARRAYS DEFINING THE ATTENUATION OVER
C                    THE LESION AND BACKGROUND
C       ECL,   ECB   ARE ECHO ARRAYS FOR THE LESION AND BACKGROUND
C
C       SL,SB,AL,AB  ARE THE BACKSCATTER AMPLITUDES AND ATTENUATIONS
C                    AS READ FROM THE KEYBOARD
C       EC           IS ECHO ARRAY IN ALGORITHM SUBROUTINE
C       GAIN0        IS GAIN ARRAY IN ALGORITHM SUBROUTINE
C       LESX, LESY   ARE THE X AND Y DIMENSIONS OF THE LESION
C                    (MEASURED IN PIXELS)
C       PROG         SELECTS ONE OF THE TGC ALGORITHMS
C       UNIL, UNIB   ARE THE UNIFORMITIES ( OR VARIABILITIES!)
C                    OF THE LESION AND BACKGROUND
C       CONT         IS THE AVERAGE CONTRAST BETWEEN THE LESION
C                    AND BACKGROUND
C
C
        REAL*8 SCATL(64),SCATB(64),
     -         ATTNL(64),ATTNB(64),
     -         ECL(64),ECB(64),
     -         SL,SB,AL,AB,
     -         EC(64),
     -         GAIN0(64),
     -         IG,SLP,
     -         GGAIN,MEAN,
     -         LATTN(64),LAATTN(64),
     -         BATTN(64),BAATTN(64),
     -         LOGE10,RLESX,RLESY,
     -         MAXL,MINL,AVRL,
     -         MAXB,MINB,AVRB,
     -         UNIL,UNIB,CONT,RNUM
C
        INTEGER I,J,K,L,M,N,X,Y,K,
     -          LESX,LESY,SMTH,PROG,
     -          OBX(5),OBY(5)
C
        COMMON/CM1/MEAN
C
        LOGE10= 2.302585093
C
C
C****** SET UP BACKSCATTERED AMPLITUDES AND ATTENUATIONS
C
C
C****** SELECT ALGORITHM
   2    WRITE(1,205)
205     FORMAT(' PLEASE TYPE ALGORITHM NO.:')
        READ(1,105) PROG
105     FORMAT( I6 )
C
C****** SELECT BACKSCATTER AND ATTENUATION
        WRITE(1,200)
200     FORMAT(' PLEASE TYPE LESION SCAT :' )
C    -                  BACKGN SCAT AND ATTN :' )
        READ(1,100) SL
100     FORMAT( G12.6 )
C
  1     DO 500  II=1,5
        IF(II.EQ.1) AL=3.33
        IF(II.EQ.2) AL=2.
        IF(II.EQ.3) AL=1.67
        IF(II.EQ.4) AL=1.33
        IF(II.EQ.5) AL=.33
C
        SB = 100.
        AB = 1.67
C
        WRITE(1,220)  SL,AL
220     FORMAT(' LESION SCATTER= ',G12.6/' LESION ATTN   =',G12.6 )
C
        IG= 0.
        SLP=1.67
        MEAN=100.
C
        AL= -AL
        AB= -AB
        SMTH = 17
        WRITE(1,230) SMTH
230     FORMAT('  Y SMOOTH WINDOW= ',I6 )
C
C****** ONE ITERATION OF ALGORITHM
C       NUM ITERATIONS=1
        N=1
```

```
C
C****** INITIALISE LESION AND BACKGROUND ARRAYS
      DO 10   I=1,64
      SCATL(I) = SB
      SCATB(I) = SB
      ATTNL(I) = AB
      ATTNB(I) = AB
 10   CONTINUE
C
C****** INITIALISE OBJECT SIZES
      OBX(1) = 2
      OBX(2) = 4
      OBX(3) = 8
      OBX(4) = 16
      OBX(5) = 32
C
      OBY(1) = 2
      OBY(2) = 4
      OBY(3) = 8
      OBY(4) = 16
      OBY(5) = 32
C
      WRITE(1,290)
290   FORMAT(' HANG ON!')
C
      DO 700  NN=1,5
      LESX = OBX(NN)
      LESY = OBY(NN)
C
C****** PUT IN LESION
      J= 32- LESY/2
      K= 32+ LESY/2 - 1
      DO 20   I=J,K
      SCATL(I) = SL
      ATTNL(I) = AL
 20   CONTINUE
C
C****** SET UP  GAIN ARRAY GAIN0(12)
120   FORMAT( 3G14.6 )
      DO 60   J=1,64
      GAIN0(J)= IG + DBLE(FLOAT(J-1))*SLP
 60   CONTINUE
C
      DO 65   I=1,64
      LATTN(I) = 0.
      DO 90   M=1,I
      LATTN(I) = LATTN(I) + ATTNL(M)
 90   CONTINUE
      LATTN(I) = LATTN(I) - ATTNL(I)
      LAATTN(I)= DEXP((LATTN(I)/20.)*LOGE10)
 65   CONTINUE
C
      DO 94   I=1,64
      BATTN(I) = 0.
      DO 95   M=1,I
      BATTN(I) = BATTN(I) + ATTNB(M)
 95   CONTINUE
      BATTN(I) = BATTN(I) - ATTNB(I)
      BAATTN(I)= DEXP((BATTN(I)/20.)*LOGE10)
 94   CONTINUE
C
C
C****** DO N ITERATIONS OF ALGORITHM
      DO 600  L=1,N
C
C****** SET UP ECHO ARRAYS ECL(64) AND ECB(64)
      DO 70   I=1,64
      GGAIN = DEXP((GAIN0(I)/20.)*LOGE10)
      ECL(I)    = GGAIN*LAATTN(I)*SCATL(I)
 70   CONTINUE
C
      DO 80   I=1,64
      GGAIN = DEXP((GAIN0(I)/20.)*LOGE10)
      ECB(I)    = GGAIN*BAATTN(I)*SCATB(I)
 80   CONTINUE
C
C****** SET UP ECHO ARRAY
      RLESY= DBLE(FLOAT( LESY))
      RLESX= DBLE(FLOAT( LESX))
      DO 98   I=1,64
      EC(I) =  ECL(I)*RLESX + ECB(I)*(64.-RLESX)
 98   CONTINUE
      DO 97   I=1,64
      EC(I) = EC(I)/64.
 97   CONTINUE
C
C     WRITE(1,260) (J,EC(J),J=1,64)
C60   FORMAT( I6,G12.4)
C
C****** PROCESS ECHO ARRAY TO FORM NEW GAIN ARRAY GAIN(12,10)
C     WHICH ALGORITHM?
      IF (PROG.EQ.1)  GOTO 900
      IF (PROG.EQ.3)  GOTO 910
      IF (PROG.EQ.2)  GOTO 920
      IF (PROG.EQ.5)  GOTO 930
C
```

```
C
C       ALGORITHM 1
900     CALL    SWPTG1( LESX,LESY,AL,AB,IG,ECL,ECB,GAIN0 )
        GOTO    600
C       ALGORITHM 3
910     CALL    SWPTG7( EC,ECL,ECB,GAIN0,SMTH )
        GOTO    600
C       ALGORITHM 2
920     CALL    SWPTG2( EC,ECL,ECB,GAIN0,SMTH )
        GOTO    600
C       ALGORITHM 4,5 OR 6
930     CALL    SWPT17( EC,ECL,ECB,GAIN0,SMTH,RLESX)
        GOTO    600
C
600     CONTINUE
C
C****** AFTER N ITERATIONS, CALCULATE THE BACKGROUND AND LESION
C       UNIFORMITY AND CONTRAST
C
        I= 32- LESY/2
        J= 32+ LESY/2 - 1
        AVRL= 0.
        DO 610  K=I,J
        AVRL = AVRL+ ECL(K)
610     CONTINUE
        AVRL= AVRL/RLESY
C
        UNIL=0.
        DO 611  K=I,J
        UNIL = UNIL+ DABS( ECL(K)-AVRL )
611     CONTINUE
        UNIL = UNIL/RLESY
C
        AVRB= 0.
        DO 620  K=10,49
        AVRB = AVRB+ ECB(K)*(64.-RLESX)
620     CONTINUE
C
        I=I-1
        J=J+1
        DO 630  K=10,I
        AVRB = AVRB+ ECL(K)*RLESX
630     CONTINUE
C
        DO 640  K=J,49
        AVRB = AVRB+ ECL(K)*RLESX
640     CONTINUE
        RNUM=  64.*40. - RLESX*RLESY
        AVRB = AVRB/RNUM
C
        UNIB = 0.
        DO 621  K=10,49
        UNIB = UNIB + DABS( ECB(K)-AVRB )*(64.-RLESX)
621     CONTINUE
        DO 631  K=10,I
        UNIB = UNIB + DABS( ECB(K)-AVRB )*RLESX
631     CONTINUE
        DO 641  K=J,49
        UNIB = UNIB + DABS( ECB(K)-AVRB )*RLESX
641     CONTINUE
C
        UNIB= UNIB/RNUM
C
        UNIL= 20.*DLOG10( (AVRL+UNIL)/AVRL )
        UNIB= 20.*DLOG10( (AVRB+UNIB)/AVRB )
        CONT= 20.*DLOG10( AVRL/AVRB )
C
C****** PRINT OUT UNIFORMITIES AND CONTRAST
        WRITE(1,250) LESX,LESY,AVRL,UNIL,
     -                  AVRB,UNIB,CONT
250     FORMAT( ' LESX',6X,I6,' LESY',I6/,' LESION  ',2G12.4
     -          /' BACKGRND',2G12.4/21X,G12.4/)
C
700     CONTINUE
C
C****** BLEEP KEYBOARD
        CALL    BLEEP
        WRITE(1,199)
199     FORMAT(1H1 )
500     CONTINUE
C
C****** SET UP AGAIN
        GOTO 2
        END
C
C
```

```
C       6 MAY 1987
C       SPACIAL RESOLUTION SIMULATION OF ADAPTIVE TGC ALGORITHMS
C
C       GROUP OF 3 SPECULAR REFLECTORS SET IN UNIFORM
C       BACKGROUND WITH TWO-WAY ATTENUATION 5 dB per cm
C
        PROGRAM SGSIM3
C
C****** VARIABLES
C
C       GAIN0,SGAIN0,SGAIN1,SGAIN ARE GAIN ARRAYS OF THE
C                       OF THE TGC ALGORITHMS
C       ECHO            IS ECHO ARRAY PASSED TO TGC ALGORITHM
C       MAX1,MAX2       ARE THE BACKSCATTERED AMPLITUDES FROM
C                       THE REFLECTORS
C       BACK            IS THE BACKSCATTERED AMPLITUDE
C                       FROM THE BACKGROUND
C       ATTN            DEFINES THE ATTENUATION OF THE MEDIA
C       SMTH            DEFINES THE SMOOTHING OPERATOR WINDOW
C
C
        REAL*8 GAIN0(64),SGAIN0(64),SGAIN1(64),SGAIN(64),
     -         ECHO(64),AECHO(64),LOGE10,
     -         MAX1,MAX2,BACK,ATTN,RK,AT
C
        INTEGER SMTH,IEC(64),IGN(64)
C
C
C
  1     LOGE10 = 2.302585093
C
C****** INITIALISE REFLECTED AMPLITUDES ( 14db AND 10dB ABOVE
C                                         BACKGROUND )
        MAX1= 501.
        MAX2= 316.
        BACK= 100.
        ATTN= -1.67
C
C****** SELECT SMOOTHING OPERATOR
C
        WRITE(1,500)
500     FORMAT(' PLEASE TYPE VALUE FOR SMTH: ')
        READ(1,600) SMTH
600     FORMAT( I6 )
C
C****** SET UP ECHO ARRAYS
        DO 10   K=1,64
        ECHO(K) = BACK
 10     CONTINUE
        DO 15   K=32,34
        ECHO(K) = MAX1
 15     CONTINUE
        DO 20   K=33,33
        ECHO(K) = MAX2
 20     CONTINUE
C
        DO 25   K=1,64
        RK = DBLE( FLOAT(K-1) )
        AT = DEXP( (RK*ATTN*LOGE10)/20. )
        AECHO(K) = ECHO(K)*AT
 25     CONTINUE
C
C****** SET UP GAIN ARRAY
        DO 30   K=1,64
        GAIN0(K)= 20.*DLOG10( BACK/AECHO(K) )
 30     CONTINUE
C
C****** SMOOTH GAIN ARRAY
C
        IF(SMTH.EQ.100) GOTO 900
C       SET UP SGAIN0
        CALL    SMGNY( GAIN0,SGAIN0,SMTH )
        GOTO 34
C
900     SMTH= 17
        CALL    SMGNY( GAIN0,SGAIN0,SMTH )
        DO 901  K=1,64
        SGAIN0(K)= ( SGAIN0(K)+ GAIN0(K) )/2.
901     CONTINUE
C
C****** CALCULATE ECHO ARRAY
C
 34     DO 35   K=1,64
        ECHO(K) = AECHO(K)*DEXP( (SGAIN0(K)/20.)*LOGE10 )
 35     CONTINUE
C
C       SET IEC
        DO 36   K=1,64
        IGN(K) = IFIX( SNGL(SGAIN0(K) ))
        IF( IGN(K).GT.250 ) IGN(K) = 250
        IF( IGN(K).LT.0 )   IGN(K) = 0
 36     CONTINUE
C
C****** DISPLAY SGAIN0(64) ON TV SCREEN
        CALL    DSL64( IGN )
C****** PRINT OUT ECHO AND GAIN ARRAYS
        WRITE(1,510) (J,ECHO(J),SGAIN0(J),J=5,60)
510     FORMAT( I6,3X,2G10.4 )
C
C****** RUN PROGRAM AGAIN
        WRITE(1,520)
520     FORMAT(1H1)
        GOTO 1
C
        END
C
```

ALGORITHM 3

```
A.C
C       12 JUNE 1986
C       DERIVES GLOBAL GAIN FUNCTION FOR ULTRASOUND IMAGE
C
C
C       Z80 ROUTINES CONTAINED IN SG7.Z80
C       LINK USING SWPTG7.CMD:
C       LINK SG7,TABS,SGFOR7,SWPTG7,SWPTG7/N/E
C       SWPTG7 DEFINES ALL LARGE DATA ARRAYS AND
C       IS LINKED 2ND OR 3RD TO BE SURE THAT THESE ARE IN THE LO 32K OF MEM.
C
C
        PROGRAM SWPTG7
C
C****** VARIABLES
C
C       EC IS ECHO FUNCTION
C       EL IS ARRAY OF ECHO VALUES AT THE SAME DEPTH
C       GAIN0 IS GAIN FUNCTION FOR DATA COLLECTION
C       SGAIN IS THE SMOOTHED GAIN FUNCTION WHICH IS
C             APPLIED TO THE IMAGE
C       GAIN  IS THE UNSMOOTHED VERSION OF SGAIN
C       DATAB IS A LOOK UP TABLE TO CONVERT GAIN TO CONTROL VOLTS
C       GNTAB IS A LOOK UP TABLE TO CONVERT CONTROL VOLTS TO GAIN
C       NLIN  IS THE NUMBER OF SCAN LINES IN THE IMAGE
C       MEAN  IS THE AVERAGE GREY LEVEL IN THE IMAGE
C       SHIFT ADJUSTS THE START POINT FOR DATA IN THE ECHO MAP
C             TO ALLOW FOR DELAYS IN THE ELECTRONICS
C       L     IS AN ARRAY HOLDING THE NUMBERS OF THE SCAN LINES
C       TO BE DIGITISED
C       NLAST IS THE NUMBER OF SCAN LINES IN THE LAST FRAME
C       GNTABI IS AN INTEGER VERSION OF GNTAB
C       STEP DEFINES THE MAXIMUM ALLOWED GAIN SLOPE
C       MODE  SELECTS HOW EC IS TO BE FORMED
C       SMTH  DEFINES THE WINDOW SIZE OF THE SMOOTHING OPERATOR
C
        REAL GNTAB(300),DGNTAB(256)
C
        INTEGER EC(64),EL(32),
     -          GAIN0(64),
     -          GAIN(64),SGAIN(64),
     -          DATAB(330),
     -          NLIN,THOLD,MEAN,SHIFT,
     -          L(32),
     -          N,A,
     -          KEY,K,
     -          NLAST,
     -          BY,LN,FROM,FOR,
     -          MED,MODE,AVR,MAX,
     -          STEP,SMTH,IA,
     -          COUNT
C
C****** COMMON STATEMENTS
        INCLUDE CMNBLK
C
C****** SET UP RECEIVER LOOK-UP TABLES
        CALL    TABS
C
C****** INITIALISE BOTH GAIN MAPS WITH SLOPE 6dB cm ,
C                                          IN.ATT. 40 dB
        CALL    INMEM
C
C****** INITIALISE PROGRAM VARIABLES
        MODE  = 1
        SHIFT = 19
        STEP  = 10
        SMTH  = 8
        MEAN  = 100
        NLAST = 0
C
C****** READ NEW PROGRAM VARIABLES
  5     CALL    VALS
C
C****** START OF FRAME
C
C****** CHANGE PROGRAM VARIABLES?
 10     CALL    CHK( KEY )
        IF (KEY.EQ.2) GOTO 5
C
C****** ZERO ARRAY GAIN0,EL
        CALL    IZER64( GAIN0 )
C
C****** READ NO.OF LINES IN FRAME
C       LNCNT CALLS CNT TO READ I/O PORT 84H
C       FOR NO. OF LINES IN FRAME
        CALL    LNCNT
C
C****** SET UP THE LINE SELECT MEMORY AND DIGITISE 32 LINES
C       STLSM DIGITISES EVERY THIRD LINE
C       ACROSS THE IMAGE
C       CALLS LSM TO SET THE LINE MAP MEM AND DIGITISE
        CALL    STLSM
        CALL    IZER64( EC )
C
C****** SET ECHO MAP ADDRESS
        CALL    STVMA( SHIFT )
```

```
C
C****** SELECT HOW EC IS FORMED
        IF(MODE.EQ.1) GOTO 80
        IF(MODE.EQ.2) GOTO 85
        IF(MODE.EQ.3) GOTO 90
C
C****** MEAN VALUE
 80     DO 15   K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    AVR32( EL,AVR )
        EC(K) = AVR
 15     CONTINUE
        GOTO 95
C
C****** MAXIMUM VALUE
 85     DO 16   K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    MAX32( EL,MAX )
        EC(K) = MAX
 16     CONTINUE
        GOTO 95
C
C****** MEDIAN VALUE
 90     J=32
        DO 17   K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    MED32( EL,MED )
        EC(K) = MED
 17     CONTINUE
C
C****** CALCULATE THE GAIN ARRAY FROM EC ARRAY
 95     CALL    CLCGN( EC,RGAIN,GAIN )
C
C****** FORM GLOBAL GAIN FUNCTION
        CALL    SMGNY( GAIN,SGAIN,SMTH )
C
C****** WRITE THE SGAIN ARRAY INTO  GAIN MAP 1
C****** WRITE THE GAIN0 ARRAY INTO  GAIN MAP 2
        CALL    GNMAP
C
C****** SET UP NEW GAIN0
        CALL    NWREF
C
C****** NEXT CYCLE
        GOTO 10
C
        END
C
```

A.

```
C
C       28 JULY 1986
C       SETS A GAIN FUNCTION FOR EACH SCAN LINE IN
C       THE ULTRASOUND IMAGE
C
C       INCORPORATES ALGORITHMS 1,2 AND 4 :
C       SELECT ALGORITHM BY CHOOSING VALUES OF STGN AND SMTH:-
C
C       ALGORITHM 1: STGN=1, SMTH=1
C       OPTIMAL VERSION OF
C       ALGORITHM 2: STGN=2, SMTH=13
C       ALGORITHM 4: STGN=3, SMTH=9
C
C
C       Z80 ROUTINES CONTAINED IN S12.Z80
C       LINK USING SWPT12.CMD:
C       LINK S12,TABS,SFOR12,SWPT12,SWPT12/N/E
C       SWPT12 DEFINES ALL LARGE DATA ARRAYS AND
C       IS LINKED 2ND OR 3RD TO BE SURE THAT THESE ARE IN THE LO 32K OF MEM.
C
C
        PROGRAM SWPT12
C
C****** VARIABLES
C
C       EC IS ECHO FUNCTION
C       EL IS ARRAY OF ECHO VALUES AT THE SAME DEPTH
C       GAIN0 IS THE  GAIN FUNCTION FOR DATA COLLECTION
C       SGAIN IS THE  GAIN FUNCTION APPLIED TO THE IMAGE
C       SGAIN1 IS THE GAIN FUNCTION DERIVED USING DATA FROM
C             THE WHOLE IMAGE
C       GAIN  IS THE UNSMOOTHED VERSION OF SGAIN
C       DATAB IS A LOOK UP TABLE TO CONVERT GAIN TO CONTROL VOLTS
C       GNTAB IS A LOOK UP TABLE TO CONVERT CONTROL VOLTS TO GAIN
C       NLIN  IS THE NUMBER OF SCAN LINES IN THE IMAGE
C       MEAN  IS THE AVERAGE GREY LEVEL IN THE IMAGE
C       SHIFT ADJUSTS THE START POINT FOR DATA IN THE ECHO MAP
C             TO ALLOW FOR DELAYS IN THE ELECTRONICS
C       L     IS AN ARRAY HOLDING THE NUMBERS OF THE SCAN LINES
C       TO BE DIGITISED
C       NLAST IS THE NUMBER OF SCAN LINES IN THE LAST FRAME
C       GNTABI IS AN INTEGER VERSION OF GNTAB
C       STEP DEFINES THE MAXIMUM ALLOWED GAIN SLOPE
C       SMTH  DEFINES THE WINDOW SIZE OF THE SMOOTHING OPERATOR
C       STGN SELECTS HOW GAIN AND SGAIN1 ARE TO BE COMBINED
C
        REAL GNTAB(300),DGNTAB(256)
C
        INTEGER EC(64),EL(32),
     -          GAIN0(64),
     -          GAIN1(64),SGAIN1(64),
     -          GAIN(64),SGAIN(64),
     -          DATAB(330),
     -          NLIN,MEAN,SHIFT,
     -          L(32),
     -          N,A,
     -          FIRST,NUM,
     -          KEY,K,
     -          NLAST,
     -          DGNTBI(256),GNTBI(300),
     -          BY,LN,FROM,FOR,
     -          SMP,MED,AVR,MAX,
     -          STEP,SMTH,IA,STGN,
     -          SMTH0,SXTN,EIGHT,ONE
C
C****** COMMON STATEMENTS
        INCLUDE CMNBLK
C
C****** SET UP RECEIVER LOOK UP TABLES
        CALL    TABS
C
C****** INITIALISE BOTH GAIN MAPS WITH SLOPE    6 dB cm
C                                              INIT.ATT. 40 dB
        CALL    INMEM
C
C****** INITIALISE PROGRAM VARIABLES
        SHIFT = 19
        STEP  = 10
        SMTH  = 9
        MEAN  = 64
        NLAST = 0
C
C****** READ PROGRAM VARIABLES
        WRITE(1,200)
200     FORMAT(' PLEASE TYPE VALUE FOR STGN (1,2,3 ) '/
     -          ' DA VALUE FOR INIT.ATT '/
     -          ' AND VALUE FOR SMTH :  ')
        READ(1,100) STGN,IA,SMTH
100     FORMAT( 3I6 )
C
C****** READ PROGRAM VARIABLES
  5     CALL    VALS
```

```
C
C****** START OF FRAME
C
C****** READ NO.OF LINES IN FRAME
C       LNCNT CALLS CNT TO READ I/O PORT 84H
C       FOR NO. OF LINES IN FRAME
C       LNCNT CHECKS THIS
 10     CALL    LNCNT
C
C****** SET UP THE LINE SELECT MEMORY AND DIGITISE 32 LINES
C       STLSM DIGITISES EVERY 2ND OR THIRD LINE
C       ACROSS THE IMAGE
C       CALLS LSM TO SET THE LINE SEL MEM AND DIGITISE
        CALL    STLSM
C
C****** PROCESS IMAGE?
        CALL    CHK( KEY )
        IF(KEY.EQ.2) GOTO 5
        IF(KEY.EQ.1) GOTO 600
C
C****** FORM GAIN0
        DO 500  K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    AVR32( EL,AVR )
        EC(K) = AVR
500     CONTINUE
        CALL    CLCGN( EC,RGAIN0,GAIN0 )
C
C****** SET GAIN MAP 2
        CALL    STG2( GAIN0,FROM,FOR )
C
C****** NEXT DATA COLLECTION CYCLE
        GOTO 10
C
C****** PROCESS IMAGE :-
C
C****** SET VIDEO MAP ADDRESS
600     CALL    STVMA(SHIFT )
C
C****** FORM SGAIN1 : THE GAIN FUNCTION DERIVED USING DATA
C       FROM THE WHOLE IMAGE
        CALL    SMGNY( GAIN0,SGAIN1,SMTH  )
        LN = 1
        DO 20   I=1,32
        CALL    IZER64(EC )
        CALL    ADDLN(LN,EC )
C
C****** FORM GAIN FUNCTION USING DATA FROM SINGLE SCAN LINE
        CALL    CLCGN(EC,RGAIN,GAIN )
        ONE  =  1
        CALL    SMGNY(GAIN,SGAIN,ONE )
C****** FORM GAIN FUNCTION TO BE APPLIED TO IMAGE
        CALL    SETGN( STGN,SGAIN,SGAIN1 )
C
C****** WRITE THE GAIN FINCTION INTO THE APPROPRIATE LINES
C       OF GAIN MAP 1
        J= L(I)
        K= L(I+1)
        K=K-J
        IF(I.EQ.32) K=110-J
        FROM=J
        FOR =K
        CALL    STG1(SGAIN,FROM,FOR )
 20     CONTINUE
C
C****** SMOOTH ACROSS IMAGE USING 4 POINT MEAN
        CALL    SMGNX
C****** BLEEP THE KEYBOARD TO INDICATE PROCESSING COMPLETE
        CALL    BLEEP
C
C****** RETURN TO DATA COLLECTION CYCLE
        GOTO 10
C
        END
C
```

ALGORITHM 5

```
C
C       13 JAN 1987
C       SETS GAIN FUNCTION FOR EACH LINE IN THE
C       ULTRASOUND IMAGE
C
C       DETECTS FLUID USING THRESHOLD SLOPE M2
C
C       Z80 ROUTINES CONTAINED IN S16.Z80
C       LINK USING SWPT16.CMD:
C       LINK S16,TABS,SFOR16,SWPT16,SWPT16/N/E
C       SWPT16 DEFINES ALL LARGE DATA ARRAYS AND
C       IS LINKED 2ND OR 3RD TO BE SURE THAT THESE ARE IN THE LO 32K OF MEM.
C
C
        PROGRAM SWPT16
C
C******** VARIABLES
C
C       EC IS ECHO FUNCTION
C       EL IS ARRAY OF ECHO VALUES AT THE SAME DEPTH
C       GAIN0 IS GAIN FUNCTION FOR DATA COLLECTION
C       SGAIN IS A GAIN FUNCTION APPLIED TO THE IMAGE
C       SGAIN1 IS THE GAIN FUNCTION DERIVED USING ALL
C              THE DATA FROM ONE IMAGE
C       GAIN  IS THE UNSMOOTHED VERSION OF SGAIN
C       DATAB IS A LOOK UP TABLE TO CONVERT GAIN TO CONTROL VOLTS
C       GNTAB IS A LOOK UP TABLE TO CONVERT CONTROL VOLTS TO GAIN
C       NLIN  IS THE NUMBER OF SCAN LINES IN THE IMAGE
C       MEAN  IS THE AVERAGE GREY LEVEL IN THE IMAGE
C       SHIFT ADJUSTS THE START POINT FOR DATA IN THE ECHO MAP
C             TO ALLOW FOR DELAYS IN THE ELECTRONICS
C       L     IS AN ARRAY HOLDING THE NUMBERS OF THE SCAN LINES
C             TO BE DIGITISED
C       NLAST IS THE NUMBER OF SCAN LINES IN THE LAST FRAME
C       GNTABI IS AN INTEGER VERSION OF GNTAB
C       STEP DEFINES THE MAXIMUM ALLOWED GAIN SLOPE
C       THOLD DEFINES THRESHOLD SLOPE M2
C       LIMIT DEFINES SLOPE M3, USED IN REGIONS IDENTIFIED AS
C             LOW ATTENUATION FLUID
C       FOCUS DEFINES DEPTH P, BEYOND WHICH THE ALGORITHM
C             WILL ATTEMPT TO DETECT FLUID
C       SMTH  DEFINES THE WINDOW SIZE OF THE SMOOTHING OPERATOR
C
        REAL GNTAB(300),DGNTAB(256)
C
        INTEGER EC(64),EL(32),
     -          GAIN0(64),
     -          GAIN1(64),SGAIN1(64),
     -          GAIN(64),SGAIN(64),
     -          DATAB(330),
     -          NLIN,THOLD,MEAN,SHIFT,
     -          L(32),
     -          N,A,
     -          FIRST,NUM,
     -          KEY,K,
     -          NLAST,
     -          DGNTBI(256),GNTBI(300),
     -          BY,LN,FROM,FOR,
     -          SMP,MED,MODE,AVR,MAX,
     -          STEP,SMTH,IA,STGN,
     -          SMTH0,SXTN,EIGHT,ONE,
     -          LIMIT,FOCUS,
     -          DA,GN,ISTEP,
     -          IGAIN(64),
     -          LIQUID
C
C****** COMMON STATEMENTS
        INCLUDE CMNBLK
C
C****** SET UP RECEIVER LOOK UP TABLES
        CALL    TABS
C
C****** INITIALISE BOTH GAIN MAPS WITH SLOPE 6dB cm
C                                          INIT.ATT.40dB
        CALL    INMEM
C
C****** INITIALISE PROGRAM VARIABLES
        THOLD = 10
        SHIFT = 19
        STEP  = 10
        LIMIT = 10
        SMTH  = 9
        MEAN  = 64
        FOCUS = 15
        LIQUID= 0
        NLAST = 0
C
C****** READ PROGRAM VARIABLES
        WRITE(1,200)
200     FORMAT(' PLEASE TYPE DA VALUE FOR INIT.ATT :  '/
     -          ' SMTH(FOR SGAIN1) AND FOCAL DISTANCE :  ')
        READ(1,100) IA,SMTH,FOCUS
100     FORMAT( 3I6 )
C
C****** READ PROGRAM VARIABLES
        KEY =   2
  5     CALL    VALS
```

```
C
C****** START OF FRAME
C
C****** READ NO.OF LINES IN FRAME
C       LNCNT CALLS CNT TO READ I/O PORT 84H
C       FOR NO. OF LINES IN FRAME
C       LNCNT CHECKS THIS
 10     CALL    LNCNT
C
C****** LIQUID COUNTS NO.OF TIMES FLUID IS DETECTED
        LIQUID= 0
C
C****** SET UP THE LINE SELECT MEMORY AND DIGITISE 32 LINES
C       STLSM DIGITISES EVERY 2ND OR THIRD LINE
C       ACROSS THE IMAGE
C       CALLS LSM TO SET THE LINE SEL MEM AND DIGITISE
        CALL    STLSM
C
C****** FORM SGAIN0
        DO 500  K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    AVR32( EL,AVR )
        EC(K) = AVR
500     CONTINUE
C
C****** PROCESS IMAGE ?
        CALL    CHK( KEY )
        IF(KEY.EQ.1) GOTO 600
        IF(KEY.EQ.2) GOTO 5
C
C****** CALCULATE GAIN0
        CALL    CLCGN( EC,RGAIN0,GAIN0 )
C
C***** SET GAIN MAP 2
        FROM =  1
        FOR  =  100
        CALL    STG2( GAIN0,FROM,FOR )
C****** NEXT DATA COLLECTION CYCLE
        GOTO 10
C
C****** PROCESS IMAGE :-
C
C****** SET VIDEO MAP ADDRESS
600     CALL    STVMA(SHIFT )
C
C****** SET UP SGAIN1
        CALL    SMGNY( GAIN0,SGAIN1,SMTH )
        LN = 1
        DO 20   I=1,32
        CALL    IZER64(EC )
        CALL    ADDLN(LN,EC )
C****** CALCULATE THE 32 GAIN ARRAYS
        CALL    CLCGN(EC,RGAIN,GAIN )
        CALL    SETGN( GAIN,SGAIN1 )
        ONE  =  1
        CALL    SMGNY(GAIN,SGAIN,ONE )
C****** WRITE THE SGAIN ARRAY INTO THE GAIN MAP
        J= L(I)
        K= L(I+1)
        K=K-J
        IF(I.EQ.32) K=110-J
        FROM=J
        FOR =K
        CALL    STG1(SGAIN,FROM,FOR )
 20     CONTINUE
C
C****** SMOOTH ACROSS IMAGE
        CALL    SMGNX
C****** BLEEP THE KEYBOARD TO INDICATE PROCESSING COMPLETE
        CALL    BLEEP
C
        WRITE(1,290) LIQUID
290     FORMAT(' FLUID DETECTED',I6,'  TIMES '/)
C
C****** RETURN TO DATA COLLECTION CYCLE
        GOTO 10
C
        END
C
```

```
C
C       13 JAN 1987
C       SETS GAIN FUNCTION FOR EACH LINE IN
C       THE ULTRASOUND IMAGE
C
C       DETECTS FLUID USING THRESHOLD SLOPE M2
C
C
C       Z80 ROUTINES CONTAINED IN S17.Z80
C       LINK USING SWPT17.CMD:
C       LINK S17,TABS,SFOR17,SWPT17,SWPT17/N/E
C       SWPT17 DEFINES ALL LARGE DATA ARRAYS AND
C       IS LINKED 2ND OR 3RD TO BE SURE THAT THESE ARE IN THE LO 32K OF MEM.
C
C
        PROGRAM SWPT17
C
C****** VARIABLES
C
C       EC IS ECHO FUNCTION
C       EL IS ARRAY OF ECHO VALUES AT THE SAME DEPTH
C       GAIN0 IS GAIN FUNCTION FOR DATA COLLECTION
C       SGAIN IS A GAIN FUNCTION APPLIED TO THE IMAGE
C       SGAIN1 IS THE GAIN FUNCTION DERIVED USING ALL
C            THE ECHO DATA FROM THE IMAGE
C       GAIN  IS THE UNSMOOTHED VERSION OF SGAIN
C       DATAB IS A LOOK UP TABLE TO CONVERT GAIN TO CONTROL VOLTS
C       GNTAB IS A LOOK UP TABLE TO CONVERT CONTROL VOLTS TO GAIN
C       NLIN  IS THE NUMBER OF SCAN LINES IN THE IMAGE
C       MEAN  IS THE AVERAGE GREY LEVEL IN THE IMAGE
C       SHIFT ADJUSTS THE START POINT FOR DATA IN THE ECHO MAP
C            TO ALLOW FOR DELAYS IN THE ELECTRONICS
C       L     IS AN ARRAY HOLDING THE NUMBERS OF THE SCAN LINES
C       TO BE DIGITISED
C       NLAST IS THE NUMBER OF SCAN LINES IN THE LAST FRAME
C       GNTABI IS AN INTEGER VERSION OF GNTAB
C       STEP DEFINES THE MAXIMUM ALLOWED GAIN SLOPE
C       THOLD DEFINES THRESHOLD SLOPE M2
C       LIMIT DEFINES SLOPE M3
C       SMTH  DEFINES THE WINDOW SIZE OF THE SMOOTHING OPERATOR
C
        REAL GNTAB(300),DGNTAB(256)
C
        BYTE NAME(11,6)
C
        INTEGER EC(64),EL(32),
     -          GAIN0(64),
     -          GAIN1(64),SGAIN1(64),
     -          GAIN(64,32),
     -          SGAIN(64),
     -          DATAB(330),
     -          NLIN,THOLD,MEAN,SHIFT,
     -          L(32),
     -          N,A,
     -          FIRST,NUM,
     -          KEY,K,
     -          NLAST,
     -          DGNTBI(256),GNTBI(300),
     -          BY,LN,FROM,FOR,
     -          SMP,MED,AVR,MAX,
     -          STEP,SMTH,IA,STGN,
     -          SMTH0,
     -          SXTN,EIGHT,ONE,FIVE,
     -          LIMIT,FOCUS,
     -          DA,GN,ISTEP,
     -          IGAIN(64),
     -          TEMP(64),
     -          LIQUID,
     -          POINT
C
C****** COMMON STATEMENTS
        INCLUDE CMNBLK
C
C****** SET UP RECEIVER LOOK UP TABLES
        CALL    TABS
C
C****** INITIALISE BOTH GAIN MAPS WITH SLOPE 6dB cm
C                                          INIT.ATT.40 dB
        CALL    INMEM
C
C****** INITIALISE PROGRAM VARIABLES
        THOLD = 10
        SHIFT = 19
        STEP  = 10
        LIMIT = 10
        SMTH  = 8
        MEAN  = 64
        FOCUS = 15
        LIQUID= 0
        NLAST = 0
C
C****** READ PROGRAM VARIABLES
        WRITE(1,200)
200     FORMAT(' PLEASE TYPE DA VALUE FOR INIT.ATT :  '/
     -          ' SMTH(FOR SGAIN1) AND FOCAL DISTANCE :  ')
        READ(1,100) IA,SMTH,FOCUS
100     FORMAT( 3I6 )
C
C****** READ PROGRAM VARIABLES
        KEY =   2
  5     CALL    VALS
```

```
C
C****** START OF FRAME
C
C****** READ NO.OF LINES IN FRAME
C       LNCNT CALLS CNT TO READ I/O PORT 84H
C       FOR NO. OF LINES IN FRAME
C       LNCNT CHECKS THIS
 10     CALL    LNCNT
C
C****** LIQUID COUNTS NO.OF TIMES FLUID IS DETECTED
        LIQUID= 0
C
C****** SET UP THE LINE SELECT MEMORY AND DIGITISE 32 LINES
C       STLSM DIGITISES EVERY 2ND OR THIRD LINE
C       ACROSS THE IMAGE
C       CALLS LSM TO SET THE LINE SEL MEM AND DIGITISE
        CALL    STLSM
C
C****** PROCESS IMAGE ?
        CALL    CHK( KEY )
        IF(KEY.EQ.1) GOTO 600
        IF(KEY.EQ.2) GOTO 5
C
C****** FORM GAIN0
        DO 500  K=1,64
        CALL    IZER32( EL )
        CALL    SMP32( K,SHIFT,EL )
        CALL    AVR32( EL,AVR )
        EC(K) = AVR
500     CONTINUE
        CALL    CLCGN( EC,RGAIN0,GAIN0 )
C
C****** SET GAIN MAP 2
        FROM =  1
        FOR  =  100
        CALL    STG2( SGAIN0,FROM,FOR )
C****** NEXT DATA COLLECTION CYCLE
        GOTO 10
C
C****** PROCESS IMAGE :-
C
C****** SET VIDEO MAP ADDRESS
600     CALL    BLEEP
        CALL    STVMA(SHIFT )
C
C****** FORM 32 GAIN FUNCTIONS
        LN = 1
        CALL    IZER64( SGAIN1 )
C
        DO 20   I=1,32
C
C****** GET EACH ECHO LINE IN TURN
        CALL    IZER64(EC )
        CALL    ADDLN(LN,EC )
C
C****** CALCULATE THE 32 GAIN ARRAYS
        CALL    CLCGN(EC,RGAIN,GAIN(1,I) )
        CALL    IADD64( GAIN(1,I),SGAIN1 )
  20    CONTINUE
C
C****** CALCULATE SGAIN1 USING THE GAIN ARRAYS
        FIVE =  5
        CALL    IDIV64( SGAIN1,FIVE )
C
C****** SET UP IGAIN AND LIMIT RATE OF GAIN RISE
        DO 610  K=1,64
        DA =SGAIN1(K)
        IGAIN(K) = GNTBI( DA )
610     CONTINUE
        DO 620  K=7,64
        IF( (IGAIN(K)-IGAIN(K-1)).GT.ISTEP) IGAIN(K)= IGAIN(K-1)+ISTEP
620     CONTINUE
C       SET UP SGAIN1 AGAIN
        DO 630  K=1,64
        GN = IGAIN(K)
        SGAIN1(K) = DATAB( GN )
630     CONTINUE
C       SMOOTH SGAIN1
        CALL    ILD64( SGAIN1,TEMP )
        CALL    SMGNY( TEMP,SGAIN1,SMTH )
C
C****** FLUID DETECT AND SET UP 32 SGAIN ARRAYS
        DO 22   I=1,32
        CALL    SETGN( GAIN(1,I),SGAIN1 )
C       SMOOTH BY ONE SETS INIT AND FINAL VALUES
        CALL    SMGNY( GAIN(1,I),SGAIN,ONE )
C
C****** WRITE THE 32 SGAIN ARRAYS INTO GAIN MAP 1
        J= L(I)
        K= L(I+1)
        K=K-J
        IF(I.EQ.32) K=110-J
        FROM=J
        FOR =K
        CALL    STG1( SGAIN,FROM,FOR )
 22     CONTINUE
C
C****** SMOOTH ACROSS IMAGE
        CALL    SMGNX
C
C****** BLEEP KEYBOARD TO INDICATE PROCESSING COMPLETE
        CALL    BLEEP
        CALL    BLEEP
C
        WRITE(1,290) LIQUID
290     FORMAT(' FLUID DETECTED',I6,'  TIMES '/)
C
C****** RETURN TO DATA COLLECTION CYCLE
        GOTO 10
C
        END
```

1.6Kb fragment in all *Eco*RI/*Hind* III and *Hind* III digests. The size of this fragment corresponds to the size of F4 itself i.e. 1.6Kb. This would suggest that the 1.6Kb band is the homologous sequence to F4 present in all clones. The two faint bands seen in the *Eco*RI/*Hind* III and *Hind* III digests of clone 4 are probably due to poor stripping of the blot after probing with F3. The 1.8Kb band normally seen in *Eco*RI digests of clones 4 and 5 with the entire *Ta*T 17 probe, is not detected by probe F4, because this fragment apparently does not present any homology with other sequences within the probe. The polymorphism detected therefore concerns only the sequences on the locus including F4 in the five clones (clones 1-5/sequences 8.6-4.9Kb).

The exact order of the fragments of F3 and F4 could not be determined from the results. Fig. 5.18 represents F3 adjacent to F5, but this fragment could equally be flanked by F4 rather than F3.

There are 0.2Kb-0.6Kb differences in sizes between the fragments detected on the blots and the hypothetical ones illustrated in Fig. 5.18 (8.6/8.3, 7.6/7, 6.8/6.5; 5.6/5.2; 4.9/4.7). The fragment sizes were estimated from a line of best fit by reference to standard fragments and so are subject to error.

Fig. 5.18 summarises the deduced maps of each clone based on the probing of a Southern blot with sub-fragments of *Ta*T 17. To prove that these maps are correct it would be necessary to clone the entire region flanked by the external *Hind* III sites from each cloned genotype and map each of these regions.

An additional assumption was made to explain the size of fragment detected by the probe for clone 1, i.e. 8.6Kb. It was necessary to postulate that a fragment of approximately 1.8Kb, flanked by two *Hind* III sites is inserted in the locus of clone 1 at either of the *Hind* III sites designated in Fig. 5.18. This would explain the large sizes detected in digests from this clone while there was apparently no differences in the location of the *Eco*RI and *Hind* III restriction sites between clone 1 and clone 3 (the latter representing the profile showed by *Ta*Tu 7, used to generate the genomic library). This would also explain why none of the subfragments (F1-F5) hybridised with this 1.8Kb fragment which apparently occurs only in clone 1 and does not show any homology with sequences elsewhere in the locus. The size of

11: Appendices

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Chris A. Roe,
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Dear Sir / Madam,

Over the past decade there has been an increasing interest in psychic phenomena, but we are only just beginning to learn about this interesting area of human experience. The Koestler Chair at the University of Edinburgh is working to extend our understanding using a wide range of methods. This survey is part of that effort.

From this survey we hope to discover a few more of the basic facts of psychic phenomena. For example, what percentage of people have had what we may call a "psychic experience", how many have sought the advice of a psychic reader, and how important or meaningful have these experiences been for them. The only way to find out is with the cooperation of a large number of people. This is why we have contacted you.

You are very important to the success of this project. Whether you have or have not had a "psychic experience", and whatever your opinion about ESP may be, your answers are just as informative and valuable to us. If we are to get an accurate picture of how common or uncommon psychic experiences really are, we will need to hear from nearly everyone that we contact. All your answers are given anonymously, and our findings will be presented in such a way that no individual could possibly be singled out or recognised. Your responses are for our academic purposes only. If you have any questions about the survey, or want to know more about it, please feel free to contact me at the above address.

If you would be interested in finding out more about the results of this survey, please include your name and address on the separate form included with this questionnaire, and we will send you details of the results as soon as we can. This form will be removed and kept separate from your questionnaire answers to ensure your anonymity.

Yours sincerely,

Chris A Roe B.Sc.

A general survey of attitudes towards psychic phenomena

Section 1.

This section presents a set of statements, each expressing an attitude about some aspect of ESP. For each of these, you should circle the number which best indicates how much you agree or disagree with the statement. For example, if you strongly agree with the claim that ESP exists, then for item 1 you would circle number '1', if you slightly disagree with this claim, you would circle number '4'.

Please note that the scale changes between statements, so that '1' sometimes indicates that you strongly agree while at others that you strongly *dis*agree with the statement.

1. I am convinced that ESP (psychic communication) exists.

1	2	3	4	5	6
strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

2. I am convinced that I have had personal experience of ESP.

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

3. I am convinced that I am psychic.

1	2	3	4	5	6
strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

4. I am convinced that it is possible to gain information about the future before it happens in ways that do not depend on common sense or the "normal" senses (sight, hearing, etc).

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

5. I am convinced that I have had at least one hunch that turned out to be correct and which (I believe) was not just a coincidence.

1	2	3	4	5	6
strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

6. I am convinced that I have had at least one premonition about the future that came true and which (I believe) was not just a coincidence.

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

7. I am convinced that I have had at least one dream which later came true and which (I believe) was not just a coincidence.

1	2	3	4	5	6
strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

8. I am convinced that I have had at least one waking vision that was not an hallucination and from which I received information that I could not have otherwise gained at that time and place.

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

10. I am convinced that it is possible to contact spirits of the dead.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

11. I am convinced that it is possible to gain information about the thoughts, feelings or circumstances of another person, in a way that does not depend on common sense or the "normal" senses (sight, hearing, etc).

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

12. I am convinced that it is possible to send a "mental message" to another person, or in some way influence them at a distance, by means other than the "normal" channels of communication.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

13. I am convinced that I have had at least one experience of telepathy (where I became aware of another person's thoughts or sensations in a way that was not due to common sense or the "normal" senses of vision, hearing etc).

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

influence the physical world, without the use of any known physical means (as for example, psychic healing, affecting the roll of dice, bending spoons or moving objects).

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

15. I am convinced that on at least one occasion I have personally exerted PK, where my mind apparently directly influenced the physical world in some way, without the use o any known physical means.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

16. I am convinced that I have strong or reliable PK ability.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

17. I am convinced that, on at least one occasion, I have witnessed an apparently psychokinetic effect on physical objects which I cannot explain in terms of a normal physical effect.

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly agree	moderately agree	slightly agree	slightly disagree	moderately disagree	strongly disagree

18. I am convinced that I have witnessed - in the past or at present - persistent physical disturbances, that seemed to be caused by PK (as for example a "poltergeist").

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

Section 2.

19. Do you read books or articles on psychic phenomena?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

never | once or twice | occasionally | sometimes | often

(if never, then goto question 20)

19b. In what kind of book or magazine do you usually read about psychic phenomena (tick just one)?

1 ---------- 2 ---------- 3 ---------- 4

popular magazines & newspapers | popular books | 'serious' magazines or journals | academic books & journals

19c. What attitude do these books and articles usually have towards the psychic phenomena they describe?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

very accepting | tend to be accepting | varies | tend to be skeptical | very skeptical

20. Have you ever practiced meditation, or any other formal mental discipline/ exercise?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

never ... regularly

20b. If so, do you still practice?

1 ---------- 2

Yes | No

21. Have you ever tried to remember or analyse your dreams for the guidance or insight they might give you?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

never | once or twice | occasionally | quite often | regularly | daily

(if never, then goto question 22)

21b. Do you still try to remember or analyse your dreams?

1 ---------- 2

Yes | No

22. Have you ever had the sort of dream in which you knew *during the dream* that you were dreaming and felt that you posessed all your waking faculties?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

never | once or twice | occasionally | quite often | regularly | nightly

23. Does chance or luck play an important role in your life?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

strongly disagree | moderately disagree | slightly disagree | slightly agree | moderately agree | strongly agree

24. Do you enjoy activities which require an involvement in fantasy?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6

not at all ... very much

This section is designed to give us a better idea of what people think of psychic readers, and includes questions asking about any experiences you may have had of psychic readings. It is important that you answer these questions freely and honestly, so we would like to emphasise that your answers are given anonymously.

25. Have you ever visited or had a reading from a practicing psychic?

1 ---------- 2

Yes No

[if not, then go on to section 4]

26. How many times have you had a reading with each of the following (please insert the number - if unsure, give an approximation)?

medium: _____ clairvoyant: _____

palm reader: _____ Tarot reader: _____

astrologist _____ other (please specify): _____

27. How often would you visit a psychic reader?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

up to once a year | 2 or 3 times a year | 4 to 6 times a year | monthly | more than once a month

28. How do you decide which particular psychic to visit (please circle the number of the response which best fits your situation)?

1 the psychic is a friend or relative
2 personal experience (been before)
3 friend's recommendation
4 visit organised by others
5 pot luck (in classified adverts etc..)
6 other (please specify) _____

29. What type of reading do you usually attend?

1 personal sitting at home
2 personal sitting at the reader's
3 as a party, with a group of friends
4 at a group meeting, (e.g. a Spiritualist Church)
5 other (please specify) _____

30. Which of the following best describes why you decided to attend a psychic reading?

1 to provide comfort / reassurance
2 to seek advice / guidance
3 to test the psychic's claims
4 out of curiosity
5 for entertainment
6 other (please state) _____

31. How accurate would you say your readings usually are?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5

very accurate | quite accurate | unsure | not very accurate | not at all accurate

32. How vague would you say your readings usually are?

1	2	3	4	5
very specific	quite specific	neither one nor the other	quite vague	very vague

33. On average, how would you evaluate your experiences of psychic readings?

1	2	3	4	5
very helpful	quite helpful	no value	quite harmful	very harmful

34. Have any of your experiences with psychic readers significantly influenced or changed any of your feelings or attitudes toward (please circle one of the options, 1 to 3, for <u>each</u> of the types listed):

		very much	a little	not at all
i.	Yourself, the kind of person you are.	1	2	3
ii.	Your view of human nature, your fellow man	1	2	3
iii.	God, your religious beliefs, the life of the spirit.	1	2	3
iv.	Life, its meaning and purpose.	1	2	3
v.	Death, old age.	1	2	3
vi.	Family and close friends.	1	2	3
vii.	Material wealth and possessions.	1	2	3

35. Have any of these experiences significantly influenced or changed any important decisions you have made in your life?

		very much	a little	not at all
i.	In your relationship(s) with your partner(s).	1	2	3
ii.	In your relationships with family members.	1	2	3
iii.	In your relationships with friends.	1	2	3
iv.	In your career.	1	2	3
v.	In moving house or country.	1	2	3
vi.	In your choice of religion.	1	2	3
vii.	In whether or not to get married, who to marry.	1	2	3
viii.	In whether or not to have children.	1	2	3
ix.	In making major purchases.	1	2	3
x.	In taking care of your health.	1	2	3
xi.	Other (please specify) _____ 1	2	3	

Section 4.

The questions in this section will help us to explore whether certain experiences or attitudes are associated with the types of psychic phenomena which people witness.

36. Are you

1	2
male	female

37. How old are you?

1	2	3	4	5	6
under 25	26-35	36-45	46-55	56-65	over 65

38. What is your marital status (please tick the one which best describes your present circumstances) ?

____ I am single
____ I am single, but live with my partner.
____ I am married and live with my husband or wife.
____ I am separated or divorced.
____ I am a widow or widower.

39. On the following scale, would you consider yourself

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5 ---------- 6
outgoing reserved

40. Are you a religious person, at least in your own fashion?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
strongly disagree | disagree | unsure | agree | strongly agree

41. How often do you actively participate in some form of traditional or institutionalised religion?

1 ---------- 2 ---------- 3 ---------- 4 ---------- 5
never | occasionally | sometimes | quite often | regularly

42. Were you raised in an environment or culture where there is a tradition of paranormal ability, or where the existence of such abilities is generally accepted?

1 ---------- 2
Yes No

Thank you very much for taking the time to complete this questionnaire. Scientific investigations of this type would be impossible without the kind cooperation of individuals such as yourself. We hope that you have found completing this survey to be interesting and informative.

Review of Previously Adopted Barnum Statements

Defined by Meehl as "personality descriptions ... made to fit the patient largely or wholly by virtue of their triviality ..[and].. carry high confidence simply because of the population base rates, regardless of the tests ability" (p. 266). Actual statements so far noted include:

Forer (1949)

- You have a great need for others to admire you.
- You have a tendency to be critical of yourself.
- You have a great deal of unused capacity which you have not turned to your advantage.
- While you have some personality weaknesses, you are generally able to compensate for them.
- Your sexual adjustment has presented problems for you.
- Disciplined and self-controlled outside, you tend to be worrisome and insecure inside.
- At times you have serious doubts as to whether you have made the right decision or done the right thing.
- You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations.
- You pride yourself as an independent thinker and do not accept others' statements without satisfactory proof.
- You have found it unwise to be too frank in revealing yourself to others.
- At times you are extraverted, affable, sociable, while at other times you are introverted, wary, reserved.
- Some of your aspirations tend to be pretty unrealistic.
- Security is one of your major goals in life.

Paterson

(in a personal letter to Forer, reproduced in Forer (1949) - the categories are included in the reproduction by Marks & Seeman)

- Above average in intelligence or mental alertness.
- Also above average in accuracy - rather painstaking at times.
- Deserves a reputation for neatness - dislikes turning out sloppy work.
- Has initiative; that is, ability to make suggestions and to get new ideas, open-mindedness.

Emotions:

- You have a tendency to worry at times but not to excess.
- You do get depressed at times but you couldn't be called moody because you are generally cheerful and rather optimistic.
- You have a good disposition although earlier in life you had to struggle with yourself to control your impulses and temper.

Interests;

- You are strongly socially inclined, you like to meet people, especially to mix with those you know well.
- You appreciate art, painting and music, but you will never be a success as an artist or as a creator or composer of music.
- You like sports and athletic events but devote more of your attention to reading about them in the sporting pages than in actual participation.

Ambitions;

- You are ambitious, and deserve credit for wanting to be well thought of by your family, business associates and friends.

- These ambitions come out most strongly in your tendency to indulge in daydreams, in building aircastles, but this does not mean that you fail to get into the game of life actively.

Vocational;

- You ought to continue to be successful so long as you stay in a social vocation. I mean if you keep at work bringing you in contact with people.
- Just what work you pick out isn't as important as the fact that it must be work bringing you in touch with people.
- On the negative side you would never have made a success at strictly theoretical work or in pure research work such as physics or neurology.

Sundberg (1955)

Many of his sts are modified from Forer and from Paterson. Others were generated from judges selections to give 2 stereotyped descriptions (converted here into the first person).

- You get depressed at times, but you couldn't be called moody.
- You are generally cheerful and rather optimistic.
- One of your troubles is difficulty in concentrating.
- You have a tendency to worry and be moody at times but not to excess.
- However, there are days when nothing seems to please you.
- You are sometimes more enthusiastic and lively than you really feel like being.
- You are occasionally bothered by physical difficulties such as headaches, but they seldom get you down.
- You secretly wish you had a better developed and healthier body.

Also included are the individual interpretations which received the highest ratings.

(Male)

- You are very normal in your attitudes, behaviour, and relationships with people.
- You get along without effort.
- People like you naturally, and you are not overly critical of them or yourself.
- You are neither overly conventional nor overly individualistic.
- Your prevailing mood is one of optimism and constructive effort.
- You are not troubled by periods of depression, psychosomatic illness or nervous symptoms.

(Female)

- You appear to be a cheerful, well-balanced person.
- You may have some alternation of happy and unhappy moods, but they are not extreme now.
- You have few or no problems with health.
- You are sociable and mix well with others.
- You are adaptable in social situations.
- You tend to be adventurous.
- Your interests are wide.
- You are fairly self-confident and usually think clearly.

Marks and Seeman (1962)

In wanting to emphasise the characteristics of triviality and high base-rate as defining Barnum statements, which they felt to be in the tradition intended by Meehl and Paterson, and in de-emphasising other characteristics particularly statement favourability, M & S set about generating an alternative set of statements. These were derived from two procedures; use of a pool of 258

Q-sort items, asked 9 therapists to describe 9 patients covering between them a broad range of psychiatric and educational problems. Item analysis revealed 19 items which failed to discriminate and thus were felt to be general or trivial.

- Feels cramped, confined, and bored by regularity and routine.
- Has difficulty in working through feelings about parents; especially own oedipal conflicts.
- Has feelings of inferiority. Has fluctuating moods.
- Has inner conflict about family role (as distinguished from reality problems).
- Is apt to be misunderstood by others.
- Is concerned with own adequacy as a person (either at a conscious or unconscious level).
- Is relatively free from disgusts and aversions.
- Is uncomfortable with uncertainty and complexities.
- Passivity (latent or manifest).
- Prefers to avoid and repress rather than to face conflicts.
- Tends to be self-defensive; anticipates being attacked and criticised.
- Tends to side-step situations; makes concessions to avoid unpleasantness.
- Utilises displacement as a defence mechanism.
- Utilises over-compensation as a defence mechanism.
- Utilises repression as a defence mechanism.
- Utilises sublimation as a defence mechanism.
- Utilises undoing as a defence mechanism.

Other items (6 and 15) are included in two other categories as the most- and least-descriptive items. Only the former are included below.

- Has inner conflict about self-assertion (as distinguished from reality problems).
- Has inner conflict about emotional dependency (as ....).
- Complains of difficulty in going asleep; of having an interrupted sleep.
- Complains of weakness or easy fatiguability.
- Is nervous, tense in manner; trembles or shows other manifest signs of anxiety.
- Is vulnerable to real or fancied threat; generally fearful; is a worrier.
- Exhibits depression (manifest sad mood).
- Reports difficulty in thinking (eg can't concentrate).

Ulrich, Stachnik & Stainton (1963)

Used the first 12 of Forer's 13 statements, presented as prose.

Mosher (1965)

Supplemented Forer's 13 with highly favourable and unfavourable items from the MMPI rewritten into a second person singular form.

Favourable:

- Your daily life is full of things that keep you interested.
- You believe that anyone who is able and willing to work has a good chance for success.
- You like to study and read about things you are working at.
- You enjoy many different kinds of play and recreation.
- You enjoy children.
- You feel that you are liked by most people who know you.
- You believe there is a God.

- You wake up fresh and rested most mornings.
- You are not afraid to handle money.
- You have no fear of water.
- You have never been in trouble because of your sex behaviour.
- You enjoy social gatherings just to be with people.

unfavourable:

- You feel that if people had not had it in for you, you would have been much more successful.
- You believe that it would be better if almost all laws were thrown away.
- You sometimes feel as if you must injure yourself or someone else.
- You feel there is little love and companionship in your home as compared to other homes.
- At times you have fits of laughing and crying that you cannot control.
- You feel that no one seems to understand you.
- You prefer to pass by school friends or people you know but have not seen for a long time unless they speak to you first.
- Most of the time you feel blue.
- Almost every day something happens that frightens you.
- You feel weak all over much of the time.
- You believe that you cannot do anything well.
- You sometimes feel that you are about to go to pieces.

Not surprisingly, these latter were only moderately accepted and so wouldn't qualify as Barnum statements.

Weisberg (1970)

Considered 70 individual personality statements, taken from the above sources and rated them for social desirability and ambiguity.

Dmitruk et al (1973)

Modified Forer's original sts to make them more or less favourable. Some of these changes seem likely to enhance the likelihood of acceptance, but overall there was no difference between the positive and negative sketches acceptance rates.

General/Positive

- You have a moderate need for others to like you and for them to admire you.
- You have a tendency to be constructively critical of yourself.
- You have a great deal of unused capacity, all of which has not been turned to your advantage.
- While you have some minor personality weaknesses, you are generally able to compensate for them.
- Your sexual adjustment has presented some minor problems for you.
- Disciplined and controlled on the outside, you are occasionally worrisome and insecure on the inside.
- You sometimes doubt whether you have made the right decision or done the right thing.
- You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations.
- You pride yourself as an independent thinker and do not accept others' opinions without satisfactory proof.
- You are usually extroverted and affable, but are occasionally wary and reserved.
- Most of your aspirations tend to be pretty unrealistic.

General/Negative

- You have too strong a need for others to like you and for them to admire you.

- You are seldom constructively critical of your own actions.
- You have a small amount of unused capacity, which you are not turning to your advantage.
- You have some major personality weaknesses, and you generally are not able to compensate for them.
- Your sexual adjustment has presented major problems for you.
- Disciplined and controlled in appearance, you are actually worrisome and insecure.
- You usually doubt whether you have made the right decision or done the right thing.
- You are disturbed by change and variety and feel more satisfied when hemmed in by restrictions and limitations.
- You pride yourself as an independent thinker, but you accept others' opinions without satisfactory proof.
- You would like to be extraverted and affable, but you are wary and reserved.
- Few of your aspirations tend to be pretty unrealistic.

Snyder (1974)

In a a paper focusing on astrology, used a general sketch drawn from statements in Linda Goodman's book *Sun Signs*.

- You have a very practical bent, and enjoy earning money, but sometimes your deep desire to be a creative person triumphs over your practicality.
- You lead other people with youre immovative ideas, or could do this if you felt more sure of yourself.
- Insecurity is your greatest weakness, and you would be wise to try to overcome this.
- Your deep sense of huour and warm, understanding nature wins you true friends, and although they may not be numerous, you share a rather intense loyalty to each other.
- With your innovative mind, you rebel against autghority, either inwardly or openly. Even though you could make a stable businessman, you would be a very idealistic one, finding it hard not to defend the underdog or try to settle arguments that arise.
- You like to think of yourself as unprejudiced, but periodically examine yourself to make sure you aren't overlooking some harmful judgements.
- You will ive a long, full life if you take care of yourself.
- You love to have freedom in whatever you're doing, and this makes you dislike monotonous tasks and being in large crowds where you can't seem to move freely.
- If someone pays you a well-deserved compliment, you enjoy hearing it, but you may not show that you do.
- Sometimes you find that the actions you take do not accomplish as much as you'd like them to, especially in dealing with people.
- You have a real grasp on how people are feelingor what they are thinking without their necessarily telling you.

Collins, Dmitruk & Ranney (1977)

Generated a positive and mixed favourability sketches. Some items were lifted from Forer. Other positive items were:

- When at ease with someone, you are able to be honest and frank about your feelings.
- You enjoy helping those who need it.
- Whenever placed in a position of authority, you try to be fair.
- You have aesthetic interests and appreciate the really beautiful aspects oflife.

- You try to be a cooperative person.
- Although you can enjoy yourself in a group, you generally prefer the company of a few close friends.

Other mixed items were:

- You cower from responsibility.
- Because of your many psychological problems, you gloss over them with a covering of defensiveness.
- You tend to be a rather confused and careless person, often getting into situations that you can't handle.

Johnson, Cain, Falke, Hayman & Perillo (1985)

Study 1 Uses Forer's 13, with half Ss rating how accurately each trait described them, while half rated them with "someone whom you know, sometimes see, and with whom you sometimes speak, but do not know well enough to consider a close friend" in mind. No attempt was made to imply that the sketch was specifically derived for them.

A separate group of 23 undergraduate judges subsequently rated each of the statements in terms of favourability using a 9-point scale. Positive statements were rated as more accurate than negative ones, and both were rated more highly for self than for other.

Study 3 expanded the number of friends rated to include self, close friend, moderate friend, and casual acquaintance. New paragraph descriptions were constructed using the following guidelines; "statements were vague and relatively short, and the descriptions were frequently hedged with qualifiers, for example 'sometimes' or 'occasionally'" (p. 1385). Paragraph pairs involve the trait dimensions of affectionate/reserved; resolute/irresolute; generous/selfish; and careful/rash. Only the affectionate/reserved pair is described.

Affectionate

- When you are with a person who can be trusted, you may express warm feelings for them.
- You may tell best friends how much their company is appreciated.
- When others share their inner thoughts and emotions with you, you may find it easy to do the same.
- With friends it may be quite easy for you to say what is on your mind and to share deep feelings that are not shared with strangers.
- In the company of such friends you feel honest and true to your emotions.
- At such times you find it easy to be open and demonstrative.
- People may sometimes remark on how talkative and affectionate you seem to be on these occasions.

Reserved

- You may feel there is a time and a place for emotions, and may occasionally show embarrassment about displaying affection in public.
- Sometimes you may prefer to keep some distance from others.
- In particular, there are certain tasks that you would prefer to do alone.
- When friends have hurt you, you may experience difficulty in showing them that you still care.
- People who don't know you well may be inclined to say that you sometimes appear cold and indifferent to strangers.
- You may find it difficult to express genuine feelings for acquaintances that you do not know well.
- You may sometimes be uncomfortable about showing affection for others.

Study 4. Used a new set of stimulus materials based on the dimensions trusting-suspicious, self reliant-dependant, stubborn-flexible, and cautious-impulsive. No examples of items are included in the paper.

Furnham and Varian (1988)

Study 2 uses negatively worded versions of Forer's statements, which appear unsatisfactorily artificial. For example; *"You do not have a tendency to be critical of yourself", "You have found it wise to be too frank in revealing yourself to others"*.

Study 3 devised new statements to "overcome the confounding of base-rate validity and positivity" and was designed to see which type of feedback Ss would prefer from the four categories general and positive, general and negative, specific and positive, and specific and negative.

General statements were taken directly from Forer (1949) and were characterised positive or negative as identified by Johnson et al. (1985). The specific statements were devised following the general rules for Barnum statements offered by Sundberg (1955). All 20 statements were rated and classified by three independent judges and found to have 94% agreement as to classification.

General/Positive

- You have a great need for other people to like and admire you.
- While you have some personality weaknesses, you are generally able to compensate for them.
- You prefer a certain amount of change/variety and become dissatisfied when hemmed in by restrictions/limitations.
- At times you are extraverted, affable, sociable, while at other times you are introverted, wary, reserved.
- Security is one of your major goals in life.

General/Negative

- At times you have serious doubts as to whether you have made the right decision or done the right thing.
- You have a great deal of unused capacity which you have not turned to your advantage.
- You pride yourself as an independent thinker and do not accept others' statements without satisfactory proof.
- Some of your aspirations tend to be pretty unrealistic.
- You have a tendency to be critical of yourself.

Specific/Positive

- You are often described by others as the most popular person they know.
- You inspire admiration and respect in all those you meet.
- You have such a broad spectrum of abilities that you could do almost anything in life.
- Often you display the self confidence and self awareness that other people can only aspire to.
- You are very socially skilled and as such can cope with the most difficult situations with apparent ease.

Specific/Negative

- When bored you often goad others into an argument just to "spice things up".
- You can be very patronising to those you see as inferior to yourself.
- You have a tendency to make unfavourable generalisations about people / situations of which you know nothing.
- In confrontation situations you tend to display extreme stubbornness and will not back down even when the evidence is stacked against you.
- You do not suffer criticism in any form with good grace.

Roe (1995)

Attempted to expand the set of Barnum statements by drawing items from the pseudopsychic literature, specifically those items that were recommended as applying to most people most of the time.

- You like to keep an open mind.
- You appear to be concentrating on the things that have gone wrong in your life.
- You wonder if your career is going in the right direction. You are feeling restless and unfulfilled.
- Children appear to play an important role in your life.
- You are quite concerned about a member of your family, possibly a child. They have caused trouble for you and your family on many occasions. You have tried to help but have met with resistance.
- You are a versatile person. You are both creative and practical, but it seems that these creative abilities have barely been tapped.
- There are times when you feel your life is one long battle. You become overwhelmed with your responsibilities, and lack the focus you once had. If you concentrate on those jobs that are really important, you can live through these phases.
- Your life hasn't developed exactly the way you expected or would have liked. Many of your goals and plans have failed to materialise.
- Relationships have not always been as easy as you would have liked. You are a good friend once people get through, but there is a reserve present, and I sense that you would rather have one or two close friends than a room full of acquaintances.
- You don't mind solitude at times. In fact you really benefit from time on your own. It gives you a chance to work things out and put things into perspective.
- You do best when working for yourself, or in a situation where you are entirely left to get on with it.
- You seem to know yourself pretty well, and have few illusions about what you are capable of. At times, you do dream about all the things you would like to be and do, but you do know inside yourself which of these are possible and which are flights of fancy.
- You are not so open as you used to be, not as ready to share with just anyone everything about your inner self as you once were. I think you've seen how that can backfire sometimes. Some of these experiences are even now still too uncomfortable to sit around and remember.
- There is a strong urge in you to be in control of your own destiny. You want to make sure that things work out the way you want them to. You don't like being along on someone else's ride. You would rather have your options open, be able to choose as you wish, and not have to depend on other peoples' schedules.
- You are still affected by a recent argument with someone.
- You have a pleasant personality.
- You are above average in intelligence.
- You appreciate lovely things, and may even be a bit of a collector.
- You are basically a friendly person and have many acquaintances but few close friends. There is a long-lasting relationship with one person in particular.
- You need to try and relax more than you do. Your life seems to be running at such a hectic pace. Try to get things in the proper perspective.
- You tend to put off chores which must be done but do not particularly interest you. You find yourself rushing and frequently face frustration with all the little things which have to be done. You need to learn how to better apportion your time and energies.

- You have often dreamed of visiting strange and exotic lands.
- You tend to act before thinking things through. You often spend money on things you don't need, and feel sorry later.
- You sometimes feel as if you attract the wrong sort of person. Others have got you into trouble more than once.
- You give the impression of being a sensible person, with your feet firmly rooted to the ground. There are times when you can get a bit carried away, but basically you live in this world.
- You are good with people, and would be excellent at dealing with the public (if you don't already do this), but you do also need some time to yourself.
- There is a woman in your past who has had a strong influence on you. The way she lived her life, some of the things she said, affected the way you have come to view parts of your life as well.
- In your past there has been a brush with death, either for you personally, or someone close to you.
- You are the sort of person who doesn't always speak up when you think you should. You may take some bad treatment from someone and you let it go, unwilling to start a screaming battle over some small but stupid, annoying or unfair incident. But then you can be pushed too far and just "explode" over something just as trivial, because you've been saving up all that feeling. You need to speak up sooner, stop yourself feeling moody or guilty because of the way others have behaved. Don't let them control you like that.
- You seem to be preoccupied with money matters, perhaps concerning a recent hitch in finances.

HTP Appendix: Statements and mean acceptance ratings

The initial pool of pseudopsychic statements was made up from readings in pseudopsychic manuals by Cain (1991), Earle (1990), Hester & Hudson (1977), Hobrin (1990), Martin (1990) and Webster (1990). Recommended readings in these sources are given in one of two forms, either as a series of distinct items, with instructions for when to apply each, or as one or more "formula readings" designed to provide a template to be adapted for specific readings. For cases of the former, all items were initially taken, whereas for the latter, the readings were divided at those points at which the topic changed (which in practice was a very straightforward procedure). Some items expressed very similar ideas or even reproduced elements from other, earlier sources. Such repetitions were eliminated to give an initial pseudopsychic statement pool of 74 items. On the basis of independent judges' assessments, the 30 that were deemed most appropriate for the context were retained. These are listed below, along with the classic Barnum statements used in this study. For all items, the mean acceptance rating is included for information.

pseudopsychic statement set

1. You like to keep an open mind. [4.25]

2. You appear to be concentrating on the things that have gone wrong in your life. [3.54]

3. You wonder if your career is going in the right direction. You are feeling restless and unfulfilled. [3.63]

4. Children appear to play an important role in your life. [2.71]

5. You are quite concerned about a member of your family, possibly a child. They have caused trouble for you and your family on many occasions. You have tried to help but have met with resistance. [2.42]

6. You are a versatile person. You are both creative and practical, but it seems that these creative abilities have barely been tapped. [4.13]

7. There are times when you feel your life is one long battle. You become overwhelmed with your responsibilities, and lack the focus you once had. If you concentrate on those jobs that are really important, you can live through these phases. [3.79]

8. Your life hasn't developed exactly the way you expected or would have liked. Many of your goals and plans have failed to materialise. [2.5]

9. Relationships have not always been as easy as you would have liked. You are a good friend once people get through, but there is a reserve present, and I sense that you would rather have one or two close friends than a room full of acquaintances. [4.13]

10. You don't mind solitude at times. In fact you really benefit from time on your own. It gives you a chance to work things out and put things into perspective. [4.58]

11. You do best when working for yourself, or in a situation where you are entirely left to get on with it. [3.79]

12. You seem to know yourself pretty well, and have few illusions about what you are capable of. At times, you do dream about all the things you would like to be and do, but you do know inside yourself which of these are possible and which are flights of fancy. [4.21]

13. You are not so open as you used to be, not as ready to share with just anyone everything about your inner self as you once were. I think you've seen how that can backfire sometimes. Some of these experiences are even now still too uncomfortable to sit around and remember. [3.71]

14. There is a strong urge in you to be in control of your own destiny. You want to make sure that things work out the way you want them to. You don't like being along on someone else's ride. You would rather have your options open, be able to choose as you wish, and not have to depend on other peoples' schedules. [4.38]

15. You are still affected by a recent argument with someone. [3.58]

16. You have a pleasant personality. [3.95]

17. You are above average in intelligence. [4.18]

18. You appreciate lovely things, and may even be a bit of a collector. [3.55]

19. You are basically a friendly person and have many acquaintances but few close friends. There is a long-lasting relationship with one person in particular. [3.77]

20. You need to try and relax more than you do. Your life seems to be running at such a hectic pace. Try to get things in the proper perspective. [3.5]

21. You tend to put off chores which must be done but do not particularly interest you. You find yourself rushing and frequently face frustration with all the little things which have to be done. You need to learn how to better apportion your time and energies. [3.68]

22. You have often dreamed of visiting strange and exotic lands. [4.18]

23. You tend to act before thinking things through. You often spend money on things you don't need, and feel sorry later. [3.14]

24. You sometimes feel as if you attract the wrong sort of person. Others have got you into trouble more than once. [2.5]

25. You give the impression of being a sensible person, with your feet firmly rooted to the ground. There are times when you can get a bit carried away, but basically you live in this world. [4.27]

26. You are good with people, and would be excellent at dealing with the public (if you don't already do this), but you do also need some time to yourself. [4.32]

27. There is a woman in your past who has had a strong influence on you. The way she lived her life, some of the things she said, affected the way you have come to view parts of your life as well. [3.18]

28. In your past there has been a brush with death, either for you personally, or someone close to you. [3.00]

29. You are the sort of person who doesn't always speak up when you think you should. You may take some bad treatment from someone and you let it go, unwilling to start a screaming battle over some small but stupid, annoying or unfair incident. But then you can be pushed too far and just "explode" over something just as trivial, because you've been saving up all that feeling. You need to speak up sooner, stop yourself feeling moody or guilty because of the way others have behaved. Don't let them control you like that. [4.41]

30. You seem to be preoccupied with money matters, perhaps concerning a recent hitch in finances. [3.14]

Barnum Statement set

1. You have a tendency to be critical of yourself. [4.45]

2. You like to be with people, especially to mix with those you know well. [4.61]

3. You pride yourself as an independent thinker and don't accept others' statements without satisfactory proof.
[4.13]

4. You occasionally get depressed, but you couldn't be called moody. [3.96]

5. You tend to be fairly normal in your attitudes and behaviour. [3.86]

6. You are usually outgoing and friendly, although at times you can be wary and reserved. [4.22]

7. Sometimes you have difficulty in concentrating. [4.15]

8. You secretly wish you had a better developed and healthier body. [3.84]

9. While you have some minor personality weaknesses, you are generally able to compensate for them. [4.17]

10. You prefer a certain amount of change and variety, and become dissatisfied when hemmed in by restrictions and limitations. [4.05]

11. Your hopes and ambitions tend to be fairly realistic. [3.7]

12. You are occasionally bothered by minor physical ailments such as headaches, but they seldom get you down. [4.24]

13. Usually disciplined and self-controlled outside, you can sometimes be feeling worrisome and insecure inside. [3.71]
14. Your sexual adjustment has caused only minor problems to you. [3.49]

15. There are times when nothing seems to please you. [3.72]

A STUDY OF ASTROLOGY

Firstly, could you let me know something about your attitude towards astrology?

(a) Do you think that the positions of the stars at the time of birth can give us some information about our personalities (circle the figure that you agree most with)?

very unlikely	unlikely	unsure	likely	very likely

1----------2----------3----------4----------5

(b) How often do you read your horoscope?

never	rarely	sometimes	often	daily

1----------2----------3----------4----------5

Now, the following is a list of characteristics agreed upon by a number of astrologers who work in the Edinburgh area as being typical of people born under

TEMPLATE

For each item you should rate how true you think the statement is of you. Give it a rating of 7 If you think it fits you perfectly, lower ratings if it fits less well and a rating of 1 if it doesn't describe you at all.

1) + You have a tendency to be critical of yourself.
- You need to be more critical of yourself.

1--------2--------3--------4--------5--------6--------7

2) + You like to be with people, especially to mix with those you know well.
- You sometimes feel uncomfortable with people, even those you know well.

1--------2--------3--------4--------5--------6--------7

3) + You pride yourself as an independent thinker, and do not accept others' statements without satisfactory proof.

- You would like to think of yourself as an independent thinker, but you do tend to accept others' statements without satisfactory proof.

1--------2--------3--------4--------5--------6--------7

4) + You occasionally get depressed, but you couldn't be called moody.
- You tend to get depressed and could even be described as moody.

1--------2--------3--------4--------5--------6--------7

5) + You tend to be fairly normal in your attitudes and behaviour.
- Some of your attitudes and behaviour could be regarded as unusual, or different from most people.

1--------2--------3--------4--------5--------6--------7

6) + You are usually quite outgoing and friendly, although at times you can be wary and reserved.
- You would like to be more outgoing and friendly, but are really quite wary and reserved.

1--------2--------3--------4--------5--------6--------7

7) + Sometimes you have difficulty in concentrating.
- One of your troubles is difficulty in concentrating.

1--------2--------3--------4--------5--------6--------7

8) + You are quite happy with your physical appearance.
- You secretly wish you had a better developed and healthier body.

1--------2--------3--------4--------5--------6--------7

9) + While you have some minor personality weaknesses, you are generally able to compensate for them.
- You have some major personality weaknesses, and you are` generally not able to compensate for them.

1--------2--------3--------4--------5--------6--------7

10) + You prefer a certain amount of change and variety, and become dissatisfied when hemmed in by restrictions and limitations.
- You are disturbed by change and variety, and feel more comfortable when enclosed by restrictions and limitations.

1--------2--------3--------4--------5--------6--------7

11) + Your hopes and ambitions tend to be fairly realistic.
- Your hopes and ambitions tend to be fairly unrealistic.

1--------2--------3--------4--------5--------6--------7

12) + You are occasionally bothered by minor physical alments such as headaches, but they seldom get you down.

- You tend to be bothered with physical ailments such as haedaches, and these can really get you down.

1--------2--------3--------4--------5--------6--------7

13) + Usually disciplined and self-controlled outside, you can sometimes be feeling worrisome and insecure inside.

- Disciplined and self-controled outside, you are actually worrisome and insecure.

1--------2--------3--------4--------5--------6--------7

14) + Your sexual adjustment has presented only minor problems to you.

- Your sexual adjustment has presented you with some major problems.

1--------2--------3--------4--------5--------6--------7

15) + There are times when nothing seems to please you.

- Often you feel that nothing pleases you.

1--------2--------3--------4--------5--------6--------7

Overall, how well do you think this description fits you?

1--------2--------3--------4--------5--------6--------7

Overall, how well do you think this description would fit someone that you know who was born under a different sign?

1--------2--------3--------4--------5--------6--------7

Thanks for your attention.

PERSONALITY QUESTIONNAIRE (3)

The B.I.P. scale

This questionnaire measures your attitudes towards phenomena and experiences that are of interest to parapsychologists. For each attitude statement, you are provided with a range of responses which indicate how much you agree with the statement. For each item, you should choose your response by placing a tick in the box for **just one** of the choices "1" to "6". Please answer all the questions.

There are no right or wrong answers on this questionnaire. For each question, it is known that different people react in different ways. Please just give your own spontaneous preferences.

Before you begin, could you please give the following information;

(i) personal identification number* _____

(ii) age _____

(iii) sex _____

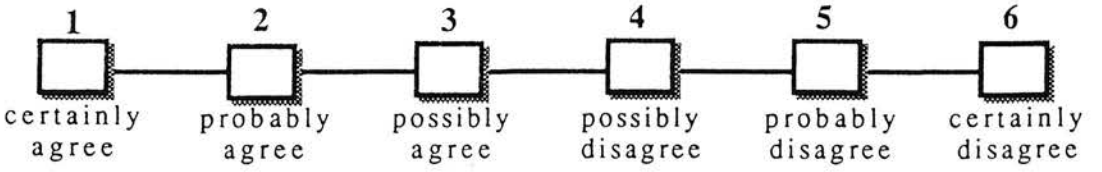
*(*This will be issued to you when you turn up for the study)*

The following are some definitions which may be useful in helping you reach your decisions;

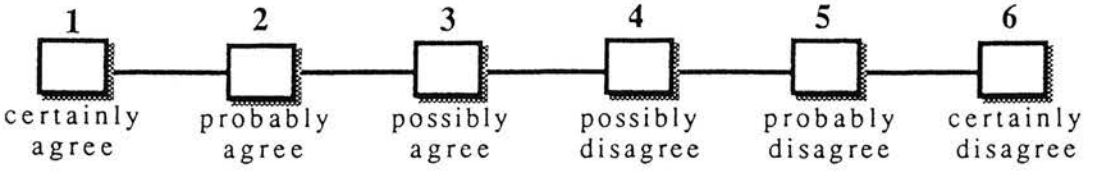
Extrasensory Perception (ESP) :	Reception of information without the use of the known senses or logical inference.
Telepathy :	ESP of the thoughts, feelings or behaviour of another person or organism.
Clairvoyance :	ESP of distant physical events or objects.
Precognition :	ESP of the future.
Psychokinesis :	Mental influence of the physical world, without the use of known physical mechanisms.

How much do you agree with the following statements ?

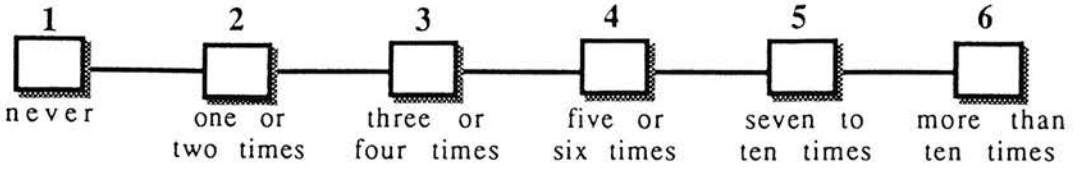
1. Some people are able to communicate telepathically.



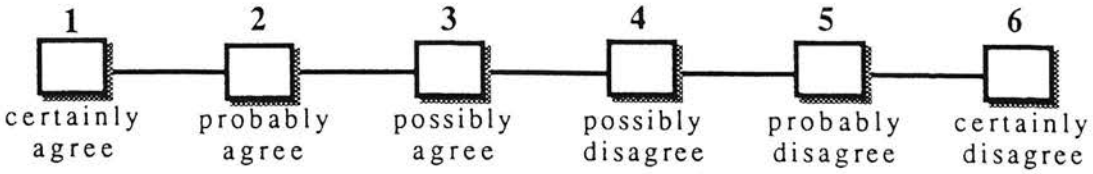
2. I personally am able to communicate telepathically.



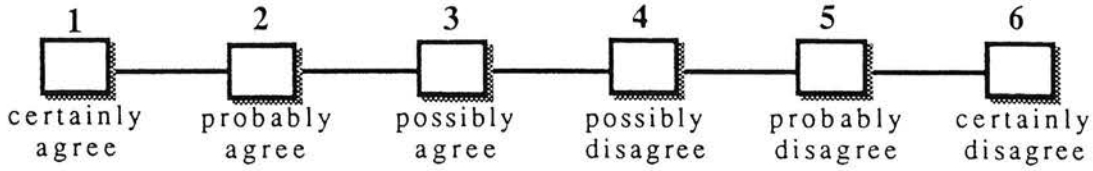
3. I have had experiences which could best be explained as telepathic.



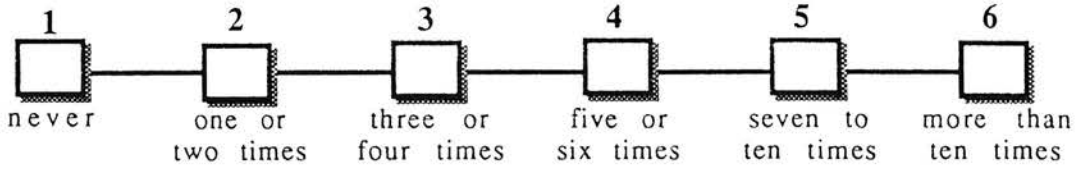
4. Some people are able to have precognitions.



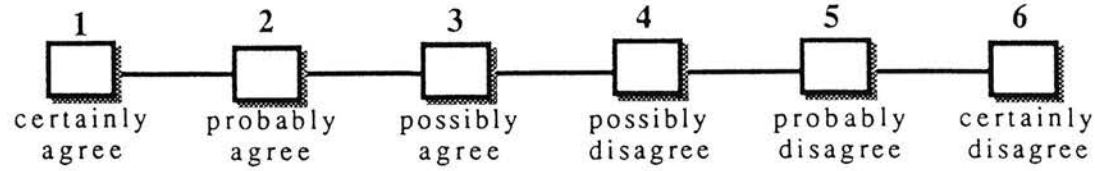
5. I personally am able to have precognitions.



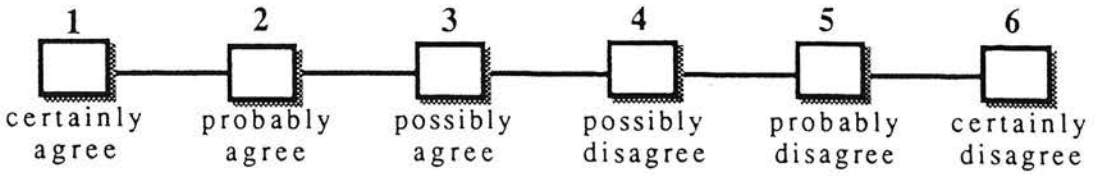
6. I have had experiences which could best be explained as precognitions.



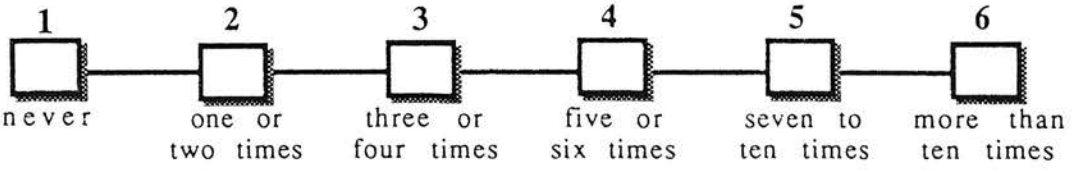
7. Some people are able to influence physical objects through the power of the mind alone.



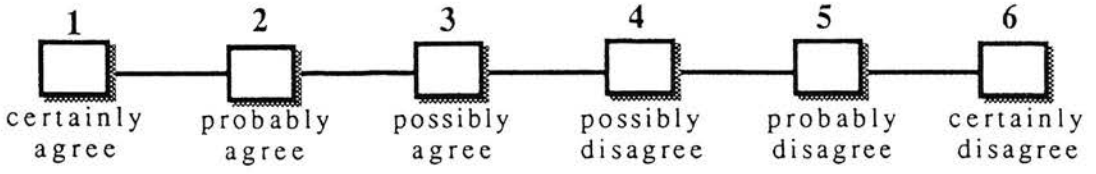
8. I personally am able to influence physical objects through the power of the mind alone.



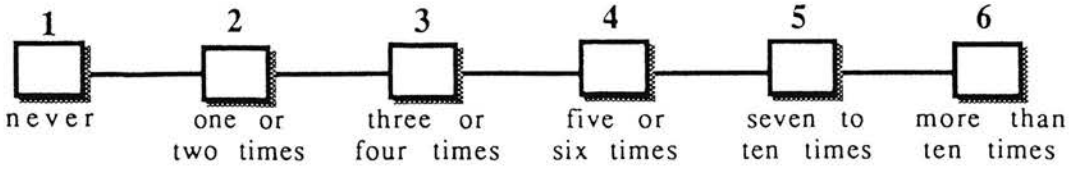
9. I have had experiences which could best be explained as the influencing of physical objects through the power of the mind alone.



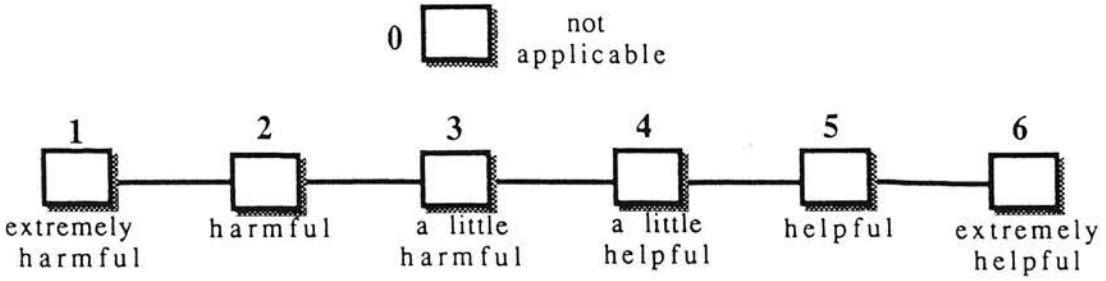
10. It is possible for some aspects of my life, past, present and future, to be revealed in the Tarot cards.



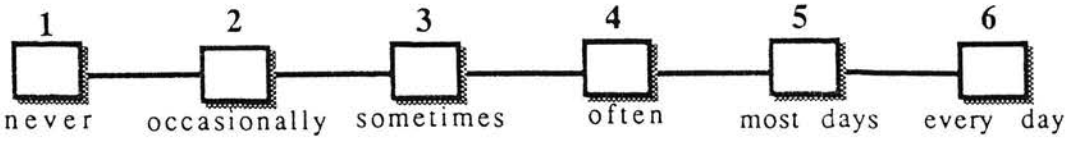
11. How many times have you visited a psychic or a Tarot reader?



12. How helpful did you find it to visit a psychic or a Tarot reader?



13. How often do you read your horoscope in the paper?



```
>LOAD "BILL"
>L.
  132 *FX7,7
  910 *FX8,7
  920 REM SETS BAUD RATES
  925 FOR L=1 TO 40
  930 *FX15,0
  940 REM FLUSHES ALL INTERNAL BUFFERS
 1000 ON ERROR GOTO 1540
 1010 REM ++++++++++++
 1020 REM THIS IS BILL
 1030 REM ++++++++++++
 1040 REM DRAW SCREEN
 1050 REM ++++++++++
 1060 MODE 4 : CLS
 1070 MOVE 80,50
 1080 DRAW 1200,50
 1090 DRAW 1200,950
 1100 DRAW 80,950
 1110 DRAW 80,50
 1120 MOVE 80,350
 1130 DRAW 1200,350
 1140 REM ++++++++++
 1150 REM READING INCOMING MESSAGE
 1160 REM +++++++++
 1170 *FX2,1
 1180 REM SHOULD GET CHARACTER FROM INPUT
 1190 FOR I=5 TO 20 : FOR J=4 TO 35
 1192 *FX3,2
 1193 REM SWITCHES OFF SCREEN
 1200 IF ADVAL(-3)<1 THEN GOTO 1200
 1210 INPUT C
 1220 REM INPUT USED HERE INSTEAD OF GET
 1225 IF C=38 THEN A$="&" : GOTO 1265
 1226 IF C=92 THEN A$="," : GOTO 1265
 1230 IF C>122 OR C<63 AND C>46 OR C<44 AND C<>9 THEN GOTO 1210
 1240 IF C=93 THEN A$=" " : GOTO 1265
 1250 IF C=91 THEN GOTO 1530
 1260 A$=CHR$(C)
 1265 *FX3,4
 1266 REM PRINTS ONLY TO SCREEN
 1270 PRINT TAB(J,I);A$
 1275 *FX3,2
 1276 REM OUTPUTS ONLY TO PRINTER BUFFER
 1280 IF C=63 THEN GOTO 1320
 1290 FOR K=1 TO 2000 : NEXT K : REM PAUSE
 1300 NEXT J : NEXT I
 1310 REM +++++++++
 1320 REM READING BUTTON BOX
 1330 REM +++++++++
 1340 B=0
 1350 LET A= ?(&FE60)
 1360 IF A=191 THEN B=1
 1370 IF A=223 THEN B=2
 1380 IF A=239 THEN B=3
 1390 IF A=247 THEN B=4
 1400 IF A=251 THEN B=5
 1410 IF A=253 THEN GOTO 1340
 1420 IF A=254 THEN GOTO 1340
 1430 IF B=0 THEN GOTO 1340
 1440 *FX3,7
 1450 REM OUTPUTS ONLY TO RS423
 1460 PRINT A
 1470 *FX3,4
 1480 REM OUTPUTS ONLY TO SCREEN
 1490 PRINT TAB(19,26) ; B
 1500 FOR I=1 TO 2000 : NEXT I
 1510 NEXT L
 1530 MODE 3 : CLS
 1540 *FX2,2
 1550 END
```

```
>LOAD "TED"
>L.
  108 *FX7,7
 1910 *FX8,7
 1920 REM SET BAUD RATES
 1925 FOR L=1 TO 40
 1930 *FX15,0
 1940 REM FLUSHES BUFFERS
 2000 REM ++++++++++
 2010 REM THIS IS TED
 2020 REM ++++++++++
 2030 REM DRAW SCREEN
 2040 REM ++++++++++
 2050 *FX3,4
 2055 Z$=""
 2060 REM PRINTS ONLY TO SCREEN
 2070 MODE 4 : CLS
 2080 MOVE 80,50
 2090 DRAW 1200,50
 2100 DRAW 1200,950
 2110 DRAW 80,950
 2120 DRAW 80,50
 2130 MOVE 80,350
 2140 DRAW 1200,350
 2150 REM ++++++++++
 2160 REM READING KEYBOARD MESSAGE
 2170 REM +++++++++
 2180 *FX2,2
 2190 REM GET INPUT FROM KEYBOARD
 2200 FOR I=5 TO 20
 2205 FOR J=4 TO 35
 2210 C=GET
 2220 IF C<123 AND C>62 THEN GOTO 2230
 2222 IF C=46 THEN GOTO 2230
 2223 IF C=38 THEN GOTO 2230
 2228 GOTO 2210
 2230 *FX3,7
 2235 REM SEND OUTPUT TO RS423 ONLY
 2240 PRINT C
 2250 *FX3,4
 2255 REM SEND OUTPUT TO SCREEN ONLY
 2257 IF C=93 OR C=91 THEN A$=" " : GOTO 2270
 2258 IF C=92 THEN A$="," : GOTO 2270
 2260 A$=CHR$(C)
 2270 PRINT TAB(J,I);A$
 2280 IF C=63 THEN GOTO 2310
 2290 NEXT J
 2291 NEXT I
 2300 REM +++++++++
 2310 REM INPUT FROM BUTTON BOX
 2320 REM +++++++++
 2325 *FX3,2
 2326 REM PRINTS ONLY TO THE PRINTER, IE NOT TO SCREEN
 2330 B=0
 2340 *FX2,1
 2345 REM INPUT FROM RS423
 2350 INPUT A
 2360 IF A=191 THEN B=1
 2370 IF A=223 THEN B=2
 2380 IF A=239 THEN B=3
 2390 IF A=247 THEN B=4
 2400 IF A=251 THEN B=5
 2430 IF B=0 THEN GOTO 2330
 2440 *FX3,4
 2450 REM PRINTS ONLY TO THE SCREEN
 2460 PRINT TAB(19,26) ; B
 2465 *FX2,2
 2466 REM INPUT FROM THE KEYBOARD
 2470 Z$=GET$
 2480 NEXT L
 3000 MODE 3 : CLS
>VDU3
```

A STUDY OF A TAROT CARD READER

Introduction

I would like to give you the opportunity to take part in an experiment which forms part of a larger research project designed to describe and evaluate psychic readings. I hope this work will be important in furthering our understanding of what is going on in readings that use Tarot cards, which have been claimed by some to give remarkable results.

An outline of the study

The main part of the study will be run here in the department, and should only take about half an hour of your time, although you will have to complete a couple of questionnaires for me as well. Your role, if you decide you would like to participate, would be to help to evaluate statements and/or predictions about you made on the basis of the spread of Tarot cards, interpreted by someone who claims expertise with the Tarot.

It's important that you should be able to make an immediate decision as to whether the statements are true of you in particular. To achieve this, the reader will be asked to limit his statements to those concerned with your personality or immediate circumstances, which you already know about. It is unlikely, then, that you will learn very much about your future circumstances, although you will be able to reach an informed decision as to whether the reader seems to know you better than they should be able to.

There is a problem in that we can pick up a lot of information from each other just by sight - our clothes, posture, and other body language, for example, say a lot about us. To prevent this, you will not actually meet the reader while the experiment is in progress, but will instead communicate through a link-up between two computer terminals.

You will also be given a couple of personality measures to complete, which will supply me with a more "objective" measure to compare with the reading you are given.

My guarantees to you

Your judgements in this study will necessarily be subjective, and are likely to be sensitive to aspects of the experiment that I can't directly control. This could include, for example, how comfortable you feel about taking part, how confident you are about what you are supposed to do, and so on.

To ensure that you are responding as naturally as possible, and to encourage your cooperation, I have given an outline (above) of what the experiment consists of, and have produced a set of assurances (below) so that you can feel more comfortable about taking part;

*the only commitment that you make is that you will turn up at the agreed time or else give me good warning that you can't make it. This is only fair when we have a reader who is prepared to give up his own time to come into the department.

*you have the right to withdraw from the experiment at any time, without having to give explanations.

*your data will be treated as confidential, and will only be used as group data. If some of the specific information you give turns out to be interesting enough to be published in its own right, I will ask for your permission to use it and will preserve your anonymity when presenting it.

*any personality questionnaire raw data collected will only be used with reference to the Tarot reading material, and will only be seen by myself. The questionnaires will be coded so that your name needn't be included with the answers.

After the study

Immediately after the experiment, I will arrange with you a time (after the whole study has been completed) when we can meet privately to discuss the session you took part in. This meeting will be an important part of the study, as it gives you the chance to describe how you felt while judging, and what factors you think may have affected your responses (important when I come to interpret the data). This kind of feedback can't be collected immediately after your reading because of time constraints when the experiment is actually running.

During the meeting I will be able to chat with you about the study, give you some idea of what the results of the experiment suggest, and answer any questions you might have. Also, I'll be happy to give you a more detailed breakdown of results at a later date, if you would like one.

What do you get out of it?

I have taken pains to emphasise that your participation is entirely voluntary, to the point that it might seem as if I'm trying to put you off. This is only so I can be sure that if you do volunteer, you will enjoy the experience and get something out of it.

One of the most obvious benefits of volunteering is in being part of a *real* study, designed to increase our understanding of a notoriously difficult but interesting area of psychology. You will become more familiar with some of the ways in which actual experiments are carried out. This is very different from the simulated experience of demonstration practicals, or even the limitations of taking part in projects for 3rd and 4th years, and gives you a better insight into how published studies are actually run.

More specific to this study, you may find (as others have in the past) that in having to evaluate statements about yourself, you will gain insights into your nature that you didn't previously recognise and which may prove useful to you.

Thanks for your time.

Chris Roe

Chris Roe.

STUDY OF A TAROT READER: JUDGES' INSTRUCTIONS

The experimental conditions

You might remember that I mentioned that there are many ways in which we can get an impression of someone we have never met before. Their clothes, posture and non-verbal behaviour are usually good indicators of personality types or can betray special interests or hobbies. This might in part account for the general feeling we might have that we are usually pretty good at weighing people up onfirst meeting them.

To prevent the reader being able to use this information (which we all do unconsciously, and can't be consciously "switched off"), I have set up a situation where you don't actually meet each other. You will be kept apart in different cubicles, but you can communicate to the reader by producing a spread of Tarot cards to be interpreted, and he will communicate with you via a computer terminal.

It is also important that you don't meet together directly after the reading either, as this would allow the reader to have some feedback for their predictions, which could also tend to confuse the data.

How to generate a Tarot spread

At this point, you should ask to be shown the Tarot deck, so that you can get a feel for what the symbols look like. They should seem physically different from one another, as they are supposed to symbolise different aspects of your life.

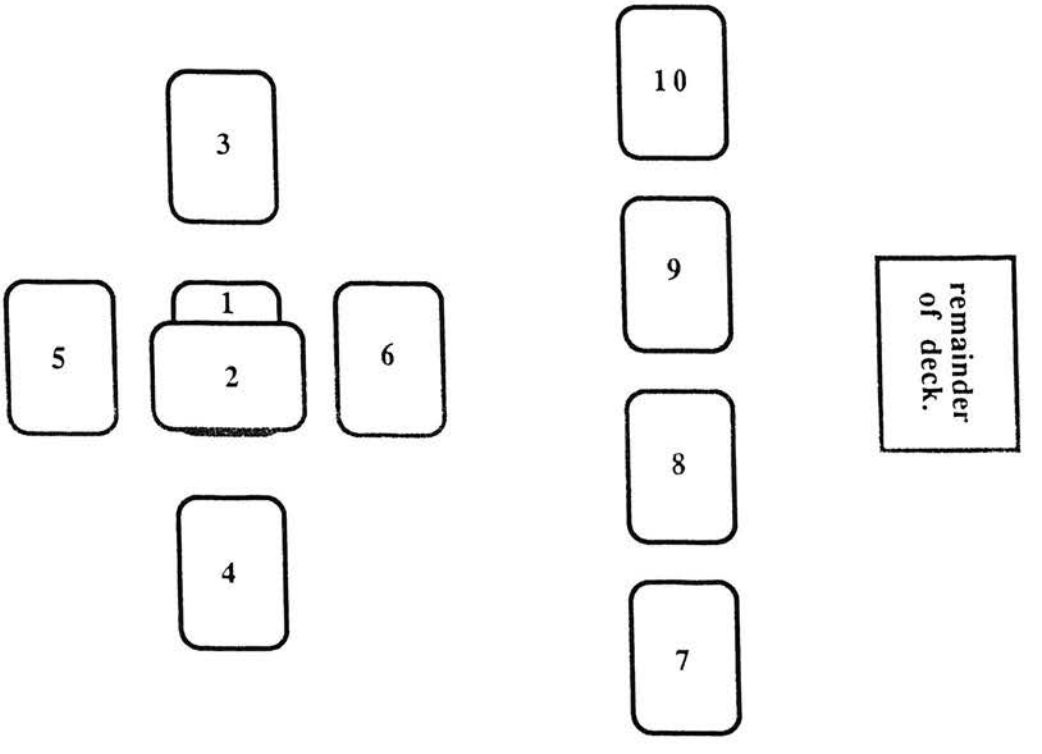
Take the cards and shuffle the pack thoroughly until you feel happy that they are well mixed.

Using your non-preferred hand, divide the pack in two (not necessarily equal) halves by cutting the deck.

"Invert" the cards of the top half, so that they become "upside down" (see below). The meaning of any inverted card will now be the reverse of its usual one.

Bring the two halves together again and reshuffle until you feel that they are thoroughly mixed.

Dealing from the top of the deck, place the cards face down **and without looking at them** in the grand cross arrangement (shown in the diagram below) on the portable table provided. . Put the first card in position 1, card 2 in position 2 and so on.You are prevented from looking at the cards because this is liable to alter your expectations (particularly if you have some knowledge of what each card means) which in turn is likely to prejudice your responses



Place the remaining cards back in their container, and leave them on the table in the position marked. I can then take the table through to the reader.

When I leave, you should lock the cubicle door behind me and leave it locked until I return for you after the reading is complete. This is so that the study can't be criticised later for the possibility that the reader could somehow have had contact with you.

Judging the reading

The reader will now try to generate impressions about you on the basis of the cards you have "chosen". This impression-gathering may take a little time, so don't be concerned if you have to wait a few minutes before you are told anything.

The impressions will be typed to your terminal as a series of statements for you to evaluate. To enable you to judge the statements, the reader will only talk about things which you can confirm or reject immediately. These will tend to be about your personality, your past and your present circumstances.

The claimant doesn't know anything about the pool of subjects that will be used, and so can't guess (for example) whether you will be an undergraduate student, a friend or aquaintance of mine, or a volunteer from the public. This may lead to some statements seeming a bit odd or obviously wrong when applied to you. Don't worry about this, but just judge each statement according to how well it applies to you.

As each impression is relayed to you, you will be asked to evaluate it by the prompt "?". At this point you should rate the statement using a seven-point scale where "1" means that it fits you very poorly and "7" that it does so very well. You should then record your rating by pressing the corresponding button on the choice box. The rating will be recorded by the computer for my analysis. The reader will not see what your rating was, but will be told by the computer that you have made a judgement and that you are ready for the next prediction.

When the reader's impressions are exhausted, you will be told that the reading is over by the message "end" being typed up instead of another statement. You should next turn to the "general evaluation" sheet and give three final ratings of your overall impressions.

The reader will signal to me that he has finished by knocking on his cubicle door, and I can then collect you. Please wait patiently in the cubicle until I get back to you.

Thank you.

INSTRUCTION SHEET : UPON COMPLETING THE TRIAL

The need for reticence

Now that you have been part of the study, you can see that it was probably not exactly as you imagined it would be. This is important, since in a normal psychic reading situation you again would only have a general idea of what to expect before you arrived, and these expectations would strongly affect the way you react to what you experience.

So that others who might be subjects in this study also arrive with only a limited knowledge of what to expect (and so behave as they would in the real situation), it is *essential* that you don't talk to anyone about the details of your experience until after the study is completed and I have chatted to you again.

Also, I gave you a "surprise" recall test after the reading was complete. This was to give me some measure of what clients of a Tarot reading are likely to remember of their reading. The most impressive evidence for the success of the Tarot comes from anecdotes and other verbal reports, so that how accurately you can remember the event becomes important. If you knew to expect a recall test, you could easily use one of many strategies to boost your memory for what you'd been told, but this wouldn't reflect the ways in which you normally remember such information. So again it becomes crucial that you don't mention these aspects of your trial to anybody until after the whole study is completed.

The reason why I strongly recommend that you tell *no-one* about the detail of the experiment is because I have drawn subjects from many different sources such that even if you only mention it to a person you know wasn't involved, they could let slip if they mentioned it to anyone else. I know that this sounds fairly unlikely, but if there was a "leak" of this kind, it could be catastrophic for any conclusions I draw from the data.

Finally, I want to remind you that an important part of the study is our meeting to discuss your trial and what you thought of it. To emphasise this importance, I want you to arrange a time to meet before you leave today.

STUDY OF A TAROT READER: A DEBRIEF.

Testing psychic claimants

Some of our work in parapsychology involves evaluating actual claims of psychic ability. We get a number of these claims every month, but don't have a very thorough means of testing them. It is difficult to know, for example, what kind of information we should expect from a true psychic.

An illustration of this that I have used in the past is that a middle-aged woman may feel more comforted (and thus more impressed) to hear that her children will be successful in their chosen careers than that she has a budgie called "Wilma". Yet the first is just a general statement which we could all guess that the woman would want to hear, while the second is actually telling us something specific and potentially paranormal. This is illustrated on a video recording that we made with a claimant, which you should have a quick look at.

As you can see, there is much here that is fairly general, but the clients came away impressed and felt that they had heard the things they hoped to hear. It's true that some general statements may be comforting to us, but will they be equally true of all of us or may there still be some psychic element at work? Is it possible to develop some kind of objective measure of how potentially psychic a statement is?

The Tarot study

Some of the information you were presented with in the study was actually derived from your cards, but some was a selection of these general statements which we knew had been used by psychic claimants in the past. To produce a standard set of statements for all subjects, it wasn't possible to use an actual psychic claimant here, but instead I had to have a member of the department type in statements that were given to them by me.

In order to get a natural response from you, I had to lead you to believe that there was actually someone doing a reading especially for you. This kind of deception can possibly have negative effects on the way you feel about the topic of an experiment, the experimenter, the general field, or even yourself. For this reason, deception is used only as a last resort, when no other methods of running the experiment are possible, and even then only with care.

The reason why I spent so much time emphasising that you should not talk to others before this meeting about the content of the study was exactly to protect you from making claims about the reading which you could later regret. And the reason why I wanted to debrief you individually was to ensure that you understood why the experiment was run as it was.

It also gives me the chance to explain that susceptibility to this kind of deception doesn't mark you down as being especially gullible. On the contrary, my own hypothesis is that your acceptance of the feedback is a result of your success in developing cognitive strategies for making sense of communications from others. This is fine in normal communications, but can be abused when people want to decieve you.

Research in parapsychology

But I don't want to leave you with the impression that all work in parapsychology is so negative or sceptical. My own studies represent only one aspect of the work that is carried out in the unit.

Generally, we are sceptical of "special stars" who claim consistent effects of the size we'd expect to see in magic shows, but are very open to the idea that most, if not all, of us have some ability in this area which may be triggered by certain events in our lives. It also seems likely that like other talents, psi abilities can be nurtured by utilising training methods. Many of the studies at Edinburgh are concerned with ways of training people to use psi in a controlled way. Despite the procedure only having been used for about three years, the results are already reasonably promising.

If you want to know more about this other work, then I would be very happy to talk to you some more about it. Also if you would like a more detailed summary of this study and what it means, then please ask and I will send a copy out to you as soon as I can.

Once again, thanks for your help.

Statement Set A

1. You like to be with people, especially to mix with those you know well.

2. You need to be more critical of yourself.

3. You don't mind solitude at times. In fact you really benefit from time on your own. It gives you a chance to work things out and put things into perspective.

4. Children appear to play an important role in your life.

5. You pride yourself as an independent thinker, and do not accept others statements without satisfactory proof.

6. You are quite happy with your physical appearance.

7. You seem to know yourself pretty well, and have few illusions about what you are capable of. At times, you do dream about all the things you would like to be and do, but you do know inside yourself which of these are possible and which are flights of fancy.

8. You are quite concerned about a member of your family, possibly a child. They have caused trouble for you and your family on many occasions. You have tried to help but have met with resistance.

9. You are usually quite outgoing and friendly, although at times you can be wary and reserved.

10. You are disturbed by change and variety, and feel more comfortable when enclosed by restrictions and limitations.

11. There is a strong urge in you to be in control of your own destiny. You want to make sure that things work out the way *you* want them to. You don't like being along on someone else's ride. You would rather have your options open, be able to choose as you wish, and not have to depend on other peoples' schedules.

12. Your life hasn't developed exactlly the way you expected or would have liked. Many of your goals and plans have failed to materialise.

13. While you have some minor personality weaknesses, you are generally able to compensate for them.

14. Disciplined and self-controlled outside, you are actually worrisome and insecure.

15. You are good with people, and would be excellent at dealing with the public (if you don't already do this), but you do also need some time to yourself.

16. You sometimes feel as if you attract the wrong sort of person. Others have got you into trouble more than once.

17. Your hopes and ambitions tend to be fairly realistic.

18. Your sexual adjustment has presented you with some major problems.

19. You are the sort of person who doesn't always speak up when you think you should. You may take some bad treatment from someone and you let it go, but then you can be pushed too far and just "explode" over something just as trivial. You need to speak up sooner, stop yourself feeling moody or guilty because of the way others have behaved.

20. In your past there has been a brush with death, either for you personally, or someone close to you.

REG Study: randomness tests

The REG passed a 256 run randomness prior to being shipped. Initial testing at the Chair consisted of 10 analysis runs each of 50 bytes. Each run was tested for (i) incidence of 0's and 1's at each bit of the 8-bit byte. (ii) phi correlation matrices to test the independence of the bits in each byte. (iii) Kolmogorov-Smirnov comparison of the distribution of 0's and 1's with that expected by chance. (iv) a comparison with theoretical expectation of the number of *runs* (eg three 0's, seven 1's etc) irrespective of their size. A final test involved sampling the REG and converting the values into statement choices (1-75), comparing the frequency distribution with chance expectation (Chi sqr). These tests gave rise to 3 significant results from 40 tests which is close to chance expectation (although all 3 were with runs).

(i) Contingency table for distribution of 0's and 1's for each of the 8 bits of each byte - 10 runs of 50 bytes.

Run:	**1.000**	**2.000**	**3.000**	**4.000**	**5.000**	**6.000**	**7.000**	**8.000**	**9.000**	**10.000**	**Cun**
Chi Sqr value	8.870	6.150	9.752	2.840	11.520	11.971	4.196	8.390	10.707	6.150	17.
p	> .3	> .7	> .3	> .8	> .1	> .1	> .7	> .2	> .1	> .5	not

(ii) Correlation matrix within bits

Using Phi coefficient. Data shown is Chi squared (= N.Phi^2) with 1 df. Observed value should be greater than 3.84 for $p<.05$, (Phi > 0.277).

Run	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
0:1	0.001	0.000	0.043	0.000	0.022	0.001	0.051	0.092	0.013	0.033
2:3	0.005	0.007	0.066	0.024	0.025	0.200	0.024	0.113	0.000	0.058
4:5	0.014	0.033	0.002	0.060	0.025	0.000	0.060	0.038	0.045	0.058
6:7	0.006	0.043	0.025	0.006	0.014	0.000	0.021	0.023	0.084	0.129
1:2	0.000	0.004	0.021	0.012	0.002	0.156	0.010	0.006	0.043	0.058
3:4	0.006	0.001	0.010	0.007	0.006	0.018	0.026	0.000	0.062	0.039
5:6	0.025	0.008	0.008	0.039	0.026	0.035	0.004	0.000	0.020	0.026
7:0	0.018	0.002	0.082	0.133	0.016	0.003	0.019	0.128	0.064	0.000
0:2	0.027	0.057	0.000	0.021	0.002	0.045	0.054	0.028	0.035	0.016
1:3	0.019	0.056	0.027	0.007	0.127	0.051	0.002	0.000	0.101	0.016
4:6	0.000	0.013	0.073	0.025	0.002	0.000	0.040	0.013	0.137	0.014
5:7	0.001	0.000	0.039	0.026	0.057	0.007	0.001	0.004	0.004	0.006
2:4	0.015	0.008	0.049	0.003	0.025	0.004	0.015	0.006	0.201	0.026
3:5	0.025	0.006	0.082	0.015	0.000	0.021	0.045	0.001	0.018	0.058
6:0	0.028	0.015	0.111	0.000	0.079	0.001	0.023	0.000	0.000	0.033
7:1	0.036	0.060	0.000	0.000	0.000	0.008	0.003	0.057	0.007	0.041

(iii) Number of 0's and 1's counted in 10 samples of 50 bytes:

Run:	1	2	3	4	5	6	7	8	9	10	Cummul
0's	201	201	197	198	200	194	179	199	210	201	1,779
1's	199	199	203	202	200	206	221	201	190	199	1,821

(iv) Kolmogorov-Smirnov one-sample test

Test of distribution; comparing with theoretical distribution. Sample is non-random if Dmax > 0.11

Run:	1.000	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000
Dmax	0.005	0.022	0.041	0.040	0.033	0.030	0.036	0.045	0.030	0.025

(v) One-sample runs test

Counts number of runs (irrespective of size of runs - although of course these are interdependent) and compares with expected. Mean number expected = 200.99 +- 9.9.

Run:	1	2	3	4	5	6	7	8	9	10
total no of runs	188	202	195	230	214	214	189	234	207	172
Runs test z	-1.301	0.101	-0.596	2.905	1.302	1.321	-0.992	3.305	0.653	-2.903
associated p	> .19	> .92	> .56	> .004*	> .19	> .19	> .32	> .001*	> .52	> .004*

Keirsey Temperament Sorter

Please read each of the following questions carefully and mark your answers on the separate answer sheet provided. There are no 'right' or 'wrong' answers to these questions, rather your answers will help show how you like to go about deciding things.

Don't think too long about any question. Some of the questions may be frustrating because you will find yourself wanting to choose a "c" option that isn't listed or because you'll say, "Well, it depends.". In these cases, try to answer with what you think would be the most typical or natural or most enjoyable result for you. Don't think of how you would behave to please your boss or partner, or of how you would like to be. Answer with what you do when you're being you.

1. At a party do you

A) interact with many, including strangers
B) interact with a few, known to you

2. Are you more

A) realistic than speculative
B) speculative than realistic

3. Is it worse to

A) have your "head in the clouds"
B) be "in a rut"

4. Are you more impressed by

A) principles B) emotions

5. Are you more drawn toward the

A) convincing B) touching

6. Do you prefer to work

A) to deadlines B) just "whenever"

7. Do you tend to choose

A) rather carefully B) somewhat impulsively

8. At parties do you

A) stay late, with increasing energy
B) leave early, with decreased energy

9. Are you more attracted to

A) sensible people B) imaginative people

10. Are you more interested in

A) what is actual B) what is possible

11. In judging others are you more swayed by

A) laws than circumstances
B) circumstances than laws

12. In approaching others is your inclination to be somewhat

A) objective B) personal

13. Are you more

A) punctual B) leisurely

14. Does it bother you more having things

A) incomplete B) completed

15. In your social groups do you

A) keep abreast of other's happenings
B) get behind on the news

16. In doing ordinary things are you more likely to

A) do it the usual way
B) do it your own way

17. Writers should

A) "say what they mean and mean what they say"
B) express things more by use of analogy

18. Which appeals to you more

A) consistency of thought

B) harmonious human relationships

19. Are you more comfortable in making

A) logical judgments B) value judgments

20. Do you want things

A) settled and decided B) unsettled and undecided

21. Would you say you are more

A) serious and determined B) easy-going

22. In phoning do you

A) rarely question that it will all be said

B) rehearse what you'll say

23. Facts

A) "speak for themselves" B) illustrate principles

24. Are visionaries

A) somewhat annoying B) rather fascinating

25. Are you more often

A) a cool-headed person B) a warm-hearted person

26. Is it worse to be

A) unjust B) merciless

27. Should one usually let events occur

A) by careful selection and choice

B) randomly and by chance

28. Do you feel better about

A) having purchased B) having the option to buy

29. In company do you

A) initiate conversation B) wait to be approached

30. Common sense is

A) rarely questionable B) frequently questionable

31. Children often do not

A) make themselves useful enough

B) exercise their fantasy enough

32. In making decisions do you feel more comfortable with

A) standards B) feelings

33. Are you more

A) firm than gentle B) gentle than firm

34. Which is more admirable:

A) the ability to organize and be methodical

B) the ability to adapt and make do

35. Do you put more value on the

A) definite B) open-ended

36. Does new and non-routine interaction with others

A) stimulate and energize you

B) tax your reserves

37. Are you more frequently

A) a practical sort of person

B) a fanciful sort of person

38. Are you more likely to

A) see how others are useful

B) see how others see

39. Which is more satisfying:
A) to discuss an issue thoroughly
B) to arrive at agreement on an issue

40. Which rules you more:
A) your head B) your heart

41. Are you more comfortable with work that is
A) contracted B) done on a casual basis

42. Do you tend to look for
A) the orderly B) whatever turns up

43. Do you prefer
A) many friends with brief contact
B) a few friends with more lengthy contact

44. Do you go more by
A) facts B) principles

45. Are you more interested in
A) production and distribution
B) design and research

46. Which is more of a compliment:
A) "There is a very logical person."
B) "There is a very sentimental person."

47. Do you value in yourself more that you are
A) unwavering B) devoted

48. Do you more often prefer the
A) final and unalterable statement
B) tentative and preliminary statement

49. Are you more comfortable
A) after a decision B) before a decision

50. Do you
A) speak easily and at length with strangers
B) find little to say to strangers

51. Are you more likely to trust your
A) experience B) hunch

52. Do you feel
A) more practical than ingenious
B) more ingenious than practical

53. Which person is more to be complimented: one of
A) clear reason B) strong feeling

54. Are you more inclined to be
A) fair-minded B) sympathetic

55. Is it preferable mostly to
A) make sure things are arranged
B) just let things happen

56. In relationships should most things be
A) renegotiable B) random and circumstantial

57. When the phone rings do you
A) hasten to get to it first B) hope someone else will answer

58. Do you prize more in yourself
A) a strong sense of reality B) a vivid imagination

59. Are you drawn more to
A) fundamentals B) overtones

60. Which seems the greater error:
A) to be too passionate B) to be too objective

61. Do you see yourself as basically
A) hard-headed B) soft-hearted

62. Which situation appeals to you more

A) the structured and scheduled
B) the unstructured and unscheduled

63. Are you a person that is more

A) routinized than whimsical
B) whimsical than routinized

64. Are you more inclined to be

A) easy to approach B) somewhat reserved

65. In writings do you prefer

A) the more literal B) the more figurative

66. Is it harder for you to

A) identify with others B) utilize others

67. Which do you wish more for yourself:

A) clarity of reason B) strength of compassion

68. Which is the greater fault:

A) being indiscriminate B) being cri' cal

69. Do you prefer the

A) planned event B) unplanned event

70. Do you tend to be more

A) deliberate than spontaneous
B) spontaneous than deliberate